





Engineering Experiment Station



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# **Educational Opportunities For Veterans**



**INTRODUCTION.**—The educational opportunities offered to the personnel of the military forces of the United States during and following the present war provide the greatest program of education ever planned by any nation. Never before have so many individuals beyond high-school age been given the privilege of securing training in any field they desire, with little or no expense and with compensation to pay all or nearly all of their personal living expenses. No matter what job, trade, or profession a serviceman may have been engaged in prior to the war, he will have a good chance to improve his knowledge and skills in that field or some other occupation.

Every serviceman should consider, carefully and seriously, how he can use this opportunity to the best advantage. Many should not enter college, but nearly everyone will find some opportunity for self-improvement through additional organized training.

The information given regarding educational advantages for veterans has been gathered from a study of the laws, from interpretations made by the Veterans Bureau, and from other reliable sources. The information has been prepared in question-answer style to be of most help to servicemen. This information may be used as a guide, but each veteran should procure definite information concerning his status from the Veterans Administration.

Brief information is also given concerning the college program for returning servicemen, and certain suggestions are offered regarding educational training while in military service for those planning to enter college.

We trust that this material will be helpful to servicemen and women in taking advantage of their educational opportunities. We will be glad to forward a copy of Form 1950 or answer any specific inquiry. For a copy of the Application Form 1950 or for further information, write

W. L. MAYER, Director of Registration  
North Carolina State College  
Raleigh, North Carolina

## Federal Assistance

**TWO TYPES OF EDUCATIONAL ASSISTANCE.** — On March 24, 1943, the 78th Congress approved a bill providing for the education or retraining of servicemen (or women) who are discharged with a service-incurred disability. This law is commonly referred to as P. L. 16.

Veterans eligible for assistance under this law are those who meet the four following requirements.

1. The person must have been in the active military or naval service any time after September 16, 1940, and during the present war;
2. He or she has been discharged or released from the active service under conditions other than dishonorable;
3. He or she must have a disability incurred in or aggravated by such service for which pension is payable under law administered by the Veterans Administration, or would be but for the receipt of retirement pay; and
4. He or she must be in need of vocational rehabilitation to overcome the handicap of such disability.

The filing of application for Pension, Veterans Administration, Form 526, will initiate a determination as to the presence or absence of a pensionable disability producing a vocational handicap. Any veteran discharged because of service-connected disability should first determine whether he is eligible for training under this act. The advantages under this act are usually more liberal, and more careful direction and supervision are given to veterans under this act.

The Servicemen's Readjustment Act of 1944 (Public Law 346), commonly referred to as the "G. I. Bill of Rights," and hereafter referred to in this bulletin as P. L. 346, contains the educational provisions for veterans not eligible for aid under P. L. 16. *The information which follows pertains only to P. L. 346 unless otherwise noted.*

**Who Is Eligible?** — Any veteran of the Armed Forces (including Waves, Wacs, Spars, et al.) who served on or after September 16, 1940, who was under twenty-five years of age at the time of enlistment, who was in service at least ninety days, and whose dismissal was other than dishonorable is eligible for educational training. Veterans who were over twenty-five at the time of enlistment and are otherwise eligible are entitled to twelve months of refresher or re-training courses, but must prove that their education was interrupted before receiving additional educational training.

**What Kind of Education Can Be Procured?**—The veteran may choose any type of education for which schools are organized—High School, Business School, Trade School, College, University, Professional School, or Graduate School. The veteran is free to choose his major field of study.

**Where Can This Education Be Procured?**—The veteran is free to select the school he desires to attend without reference to the state in which he resides. The school attended must be approved by the Veterans Administration, but this list is secured from the official accrediting agency in each state, and therefore will include all schools normally approved by a state's Educational Accrediting Agency.

**How Much Education Can Be Procured?**—The maximum time allowed any veteran will be forty-eight months. Each qualified veteran is entitled to twelve months plus as many months as time of service since September 16, 1940. The time spent in organized college programs such as ASTP and Navy V-12 may be deducted from the total time. Not more than twelve months may be devoted to refresher courses. A veteran will receive additional assistance to complete the term in progress when his allotted time expires.

**How Can This Education Be Procured?**—The educational training is figured in months and may be taken in any time sequence desired by the veterans and provided by the school—continuous school attendance, normal school attendance (college year), broken attendance, or part-time attendance. Part-time attendance provides for pro rata financial assistance.

**When Can a Veteran Begin Training?**—A veteran may begin his training immediately after his discharge. He must begin his training within two years after his discharge or the termination of the war, whichever is later. Educational opportunities must be completed within seven years after the termination of the war.

**What Compensation Is Received While Attending School?**—A veteran receives \$50.00 per month, or \$75.00 per month if married (or having dependents), during the months he attends school. Payments are not made during long vacation periods, but such periods do not count in the time allowance. This payment is for room, board, and other personal expenses. The Government pays the school for all educational expenses including tuition, fees, books, supplies, etc., not to exceed \$500.00 for the college year (September to June). Any excess above the \$500.00 must be paid by the veteran. Pro rata educational costs are allowed for summer school attendance.

**How Should a Veteran Apply for Educational Benefits?**—Application should be made on Veterans Administration Form 1950 which can be secured from any regional office of the Veterans Administration or from many educational institutions. This form should not be filed until the serviceman has received his discharge from military service.

Disabled veterans should first write a letter to the Veterans Administration, giving full information concerning their previous service connections and requesting educational assistance under P. L. 16. If this is denied, they should then file form 1950.

The veteran will receive a communication (in duplicate) from the office of the Veterans Administration, indicating approval (or disapproval) of his application and stating the number of months of education to which he is entitled. The veteran should retain these letters until a copy is requested by the school. The letter is used in lieu of regular payments of tuition, fees, and other educational costs.

**Where Should a Veteran Write?**—If a veteran knows the school he will attend, he should write to the Veterans Administration's regional office which has jurisdiction where the school is located. If a school has not been selected, the veteran may apply to the office nearest his home or point of discharge. A list of the Regional Offices will be found elsewhere in this publication.

**How Should a Veteran Enroll In School?**—A veteran enrolls in exactly the same manner as any other student. A school may have a special organization for veterans and may have special regulations concerning the admission of veterans, but so far as the Veterans Administration is concerned, he applies in a normal manner.

**Is a Veteran Given Special Supervision?**—Veterans attending school under P. L. 346 are regularly enrolled students subject to the normal rules and regulations of the institution and no special supervision is provided by the Veterans Administration. Individual schools may have special administrative or supervisory regulations to assist veterans in their readjustment to school life.

Veterans attending under P. L. 16 are supervised by an educational officer of the Veterans Administration as well as by the college administration.

**When Do Monthly Allotments Begin?**—The institution notifies the Veterans Administration of the date the veteran enrolls. Allotments begin as of that date and continue until the institution notifies the Veterans Administration of the withdrawal of the student or the closing of a school session. However, allotments are paid at the close

of each month, and some time may elapse in getting allotments started. Therefore, veterans should make financial arrangements with the institution, or otherwise, for room, board, and other personal expenses until allotments are received. Payments for subsistence allowances are based on calendar months and a veteran is paid for the exact period he is in attendance.

### **Regional Offices of the Veterans Administration Are Located At**

Albuquerque, New Mexico	Los Angeles, California
Atlanta, Georgia	Lyons, New Jersey
Baltimore, Maryland	Manchester, New Hampshire
Batavia, New York	Minneapolis, Minnesota
Bay Pines, Florida	Montgomery, Alabama
Boise, Idaho	Murfreesboro, Tennessee
Boston, Massachusetts	Muskogee, Oklahoma
Brecksville, Ohio	Newington, Connecticut
Cheyenne, Wyoming	New Orleans, Louisiana
Columbia, South Carolina	New York, New York
Dayton, Ohio	Philadelphia, Pennsylvania
Dearborn, Michigan	Pittsburgh, Pennsylvania
Denver, Colorado	Portland, Oregon
Des Moines, Iowa	Providence, Rhode Island
Fargo, North Dakota	Reno, Nevada
Fayetteville, North Carolina	Roanoke, Virginia
Ft. Harrison, Montana	Salt Lake City, Utah
Hines, Illinois	San Francisco, California
Huntington, West Virginia	Seattle, Washington
Indianapolis, Indiana	Sioux Falls, South Dakota
Jackson, Mississippi	Togus, Maine
Jefferson Barracks, Missouri	Tucson, Arizona
Kansas City, Missouri	Waco, Texas
Lexington, Kentucky	Washington, D. C.
Lincoln, Nebraska	White River Junction, Vermont
Little Rock, Arkansas	Wichita, Kansas
	Wood, Wisconsin

## College Program For Veterans



**Scope of Training Available.**—The North Carolina State College of Agriculture and Engineering of the University of North Carolina is the State's technological institution giving instruction in Agriculture and Forestry, Engineering, Vocational Teacher Training, and Textiles. Detailed information concerning the majors in these general fields is given in the regular college publications, which will be furnished on request. All qualified veterans are eligible to enroll in any major offered by the college.

In addition, the college will permit a veteran to enroll as a special student to take such specialized work as may be arranged between the student and the Dean of the School. Special students are not granted degrees.

**Admission and Guidance.**—All veterans will apply for admission and have their credentials approved in the same manner as other students. Special guidance assistance will be available whenever needed.

**Special Admission.**—In addition to the admission of veterans in the customary manner, the North Carolina College Conference with the approval of the State Department of Public Instruction has approved the admission of veterans at any college in the state under the regular procedure governing the admission of mature students. Under this provision a veteran not qualified for admission based on high school graduation may be admitted through special examinations.

**Refresher Courses.**—Realizing that veterans who had been in college prior to military service would, in most cases, need to spend some time in review before beginning advanced work, the government has provided a maximum of twelve months of refresher work under Public Law 346. In keeping with the policy, the college is planning refresher work in basic courses to aid veterans in their readjustment to student life.

**Credit for Military Service.**—It is not the policy of colleges to allow credit for military service in lieu of regular academic courses. At this institution the credits required for graduation include thirty-six term credits which may be earned in military science and physical education. The college will allow this amount of credit toward graduation to any veteran who has been in active military service as much as one year. Whenever this maximum is allowed, no credits previously or thereafter earned in military science or physical education can be used toward fulfilling graduation requirements. (The War Department

has ruled that any veteran desiring to compete for a reserve commission under the organized college ROTC program must take the basic course prescribed in the freshman and sophomore years. Military service will not be accepted as a substitute.) Veterans who have been in service as much as six months are excused from all requirements in Physical Education and Military Science but receive credit allowance toward graduation.

**Credits for Service Courses of Instruction.**—The American Council on Education with the co-operation and support of most of the national educational organizations has selected a national committee to evaluate and make recommendations concerning credit for the various types of instruction provided by the Armed Forces. This institution will be guided by the recommendations made by this committee.

**Credit for USAFI Courses.**—This institution will consider for credit courses of college level taken through the United States Armed Forces Institute. Those taking courses for college credit should be careful in their selection of courses and should secure information from the college they wish to attend relative to the use of each course in the major they have selected. The major question is not related to college credit, but whether or not the course may be used in the major selected. The answer to this question will also depend upon an individual's previous college training. All college curricula allow for some elective courses and usually almost any subject may be elected. However, when a student has earned this amount of credit, no additional elective work can be accepted toward graduation; thus, no additional work can be taken in the USAFI unless it can be accepted as a substitute for a required course.

Individuals interested in technical or specialized training should also avoid taking courses of a general nature which are inadequate for their specialty. For example, a general introductory course in physics may be accepted for credit in Liberal Arts, Law, Medicine, Agriculture and most other fields but may not be accepted in Engineering where the physics course is highly specialized and is based on a good knowledge of college mathematics. Furthermore, such a course may not be used as an elective in Engineering because the content to a great extent would have been repeated in the Engineering physics course. Whenever possible, it is recommended that approval be procured from the college to be attended. In writing for information, one should state what college credits have already been earned, as well as a statement about the major field of study.

**Proper Preparation.**—The most important item to consider is proper preparation to enter college. More time will be gained by proper preparation than by taking college courses. The two major considerations

for students interested in technical education are English and mathematics. We suggest such courses under the USAFI as H83, H84, H85, H87, H88, H89, H90, H95, H96, H134, H148, H136, H137, H138, H139, H140, H141, H142, H143, H144, and H145. Each individual with the aid of any available educational adviser should select those courses which best coincide with his previous training. The courses listed above do not give college credit. After proper preparation by the student, attention may be given to college courses under the USAFI or regular college extension courses.

The college, through its extension division, offers a correspondence course in the review of high school English Grammar and Composition and another course in the review of high school algebra. These are excellent courses to enable a student to judge his preparation. If he has little difficulty with the content of these courses, he can consider his preparation satisfactory for admission to college. These courses are not for college credit.

**The College Extension Division.**—The College Extension Division is co-operating with the USAFI and is endeavoring to provide courses which will be of special benefit to those who plan to enter technological colleges after their release from military service. The courses offered by the College Extension Division, which have already been approved, are listed in the USAFI catalog. Other courses will be approved for publication in the next catalog.

The courses outlined below are for students who desire to begin their college work before entering this institution, who believe their preparation is satisfactory, and who are not presenting advanced standing in the subjects they desire to take.

For all students:

English Composition Eng. 101 (Fall term)	3 term credits
English Composition Eng. 102 (Winter term)	3 term credits
English Composition Eng. 103 (Spring term)	3 term credits

(Not more than two terms can be taken by correspondence and final credit will not be allowed until one term has been passed in residence with at least a "C" grade.)

For Engineering students:

Algebra	Math. 101	6 term credits
Trigonometry	Math. 102	6 term credits
Analytical Geometry	Math. 103	6 term credits

For other than engineering students:

Algebra	Math. 111	4 term credits
Trigonometry	Math. 112	4 term credits
Mathematics of Finance	Math. 113	4 term credits

For information regarding any extension courses, or for an extension course catalog, write Mr. E. W. Ruggles, Director, College Extension Division, North Carolina State College, Raleigh, North Carolina.

# STATE COLLEGE RECORD

Vol. 44

DECEMBER, 1944

No. 4

The North Carolina State College

of

Agriculture and Engineering

of

THE UNIVERSITY OF NORTH CAROLINA



CATALOG ISSUE

1944-45

*Announcements for the Session 1945-1946*

STATE COLLEGE STATION  
RALEIGH

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**COLLEGE CALENDAR\***  
1945-1946

	Fall 1945	Winter 1946	Spring 1946	Summer 1946
College Faculty Meeting—3 p.m.	Sept. 14	Dec. 27	Mch. 19	June 11
<sup>1+2</sup> Registration of Freshmen	Sept. 18			
<sup>2+3</sup> Registration of new students admitted with advanced standing	Sept. 19	Dec. 27	Mch. 19	June 11
<sup>2+4</sup> Registration of sophomores, juniors, seniors and graduate students	Sept. 21	Dec. 27	Mch. 19	June 11
Class work begins	Sept. 24	Dec. 28	Mch. 20	June 12
Anniversary Day (not a holiday)	Oct. 3			
Last day for registration and changes in registration	Oct. 3	Jan. 5	Mch. 30	June 22
Mid-term reports due	Oct. 29	Feb. 4	Apr. 22	July 22
Final date for dropping a course without a grade of "F"	Nov. 10	Feb. 16	May 4	Aug. 3
Thanksgiving (not a holiday)				
Final examinations begin	Dec. 7	Mch. 7	May 27	Aug. 21
Term ends	Dec. 13	Mch. 13	June 1	Aug. 27
Commencement Exercises			June 2,3	

\* In event of emergency, this calendar is subject to change.

<sup>1</sup> Freshmen should be present for their first Assembly in Pullen Hall at 7:15 p.m., Sept. 17.

<sup>2</sup> An extra fee is charged for registration after the day designated.

<sup>3</sup> New students with advanced standing of fewer than 45 credits are required to register with the freshmen. See footnote 1.

<sup>4</sup> Each student should register with his class as indicated on his registration card.

# 1945

JANUARY							APRIL							JULY							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	
7	8	9	10	11	12	13	8	9	10	11	12	13	14	8	9	10	11	12	13	14	7	8	9	10	11	12	13
14	15	16	17	18	19	20	15	16	17	18	19	20	21	15	16	17	18	19	20	21	14	15	16	17	18	19	20
21	22	23	24	25	26	27	22	23	24	25	26	27	28	22	23	24	25	26	27	28	21	22	23	24	25	26	27
28	29	30	31				29	30						29	30	31					28	29	30	31			
FEBRUARY							MAY							AUGUST							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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11	12	13	14	15	16	17	13	14	15	16	17	18	19	12	13	14	15	16	17	18	11	12	13	14	15	16	17
15	19	20	21	22	23	24	20	21	22	23	24	25	26	19	20	21	22	23	24	25	18	19	20	21	22	23	24
25	26	27	28				27	28	29	30	31			26	27	28	29	30	31		25	26	27	28	29	30	
MARCH							JUNE							SEPTEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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11	12	13	14	15	16	17	10	11	12	13	14	15	16	9	10	11	12	13	14	15	9	10	11	12	13	14	15
18	19	20	21	22	23	24	17	18	19	20	21	22	23	16	17	18	19	20	21	22	15	17	18	19	20	21	22
25	26	27	28	29	30	31	24	25	26	27	28	29	30	23	24	25	26	27	28	29	23	24	25	26	27	28	29

# 1946

JANUARY							APRIL							JULY							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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13	14	15	16	17	18	19	14	15	16	17	18	19	20	14	15	16	17	18	19	20	13	14	15	16	17	18	19
20	21	22	23	24	25	26	21	22	23	24	25	26	27	21	22	23	24	25	26	27	20	21	22	23	24	25	26
27	28	29	30				28	29	30					28	29	30	31				27	28	29	30	31		
FEBRUARY							MAY							AUGUST							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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3	4	5	6	7	8	9	5	6	7	8	9	10	11	4	5	6	7	8	9	10	3	4	5	6	7	8	9
10	11	12	13	14	15	16	12	13	14	15	16	17	18	11	12	13	14	15	16	17	10	11	12	13	14	15	16
17	18	19	20	21	22	23	19	20	21	22	23	24	25	18	19	20	21	22	23	24	17	18	19	20	21	22	23
24	25	26	27	28	29	30	26	27	28	29	30			25	26	27	28	29	30	31	24	25	26	27	28	29	30
MARCH							JUNE							SEPTEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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24	25	26	27	28	29	30	23	24	25	26	27	28	29	29	30						29	30	31				

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Name	Address	County
Mrs. Katherine P. Arrington	Warrenton	Warren
H. D. Bateman	Wilson	Wilson
J. B. Fearing	Windsor	Bertie
Battle A. Hocutt	Clayton	Johnston
Ira T. Johnston	Jefferson	Ashe
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H. B. Marrow	Smithfield	Johnston
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William D. Merritt	Roxboro	Person
Walter Murphy	Salisbury	Rowan
Haywood Parker	Asheville	Buncombe
Clarence Poe	Raleigh	Wake
J. T. Pritchett	Lenoir	Caldwell
Carl A. Rudisill	Cherryville	Gaston
George Stephens	Asheville	Buncombe
W. H. Sullivan	Greensboro	Guilford
Fred I. Sutton	Kinston	Lenoir
H. P. Taylor	Wadesboro	Anson
John W. Umstead, Jr.	Chapel Hill	Orange
Lionel Weil	Goldsboro	Wayne
Charles Whedbee	Hertford	Perquimans

### Term Expiring April 1, 1949

Emily Austin	Tarboro	Edgecombe
Annie Moore Cherry	Enfield	Halifax
David Clark	Charlotte	Mecklenburg
James H. Clark	Elizabethtown	Bladen
K. Clyde Council	Wananish	Columbus
Josephus Daniels	Raleigh	Wake
B. B. Everett	Palmyra	Halifax
Mrs. R. S. Ferguson	Taylorsville	Alexander
James S. Ficklin	Greenville	Pitt
James Alexander Gray	Winston-Salem	Forsyth
R. L. Harris	Roxboro	Person

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Claude W. Rankin	Fayetteville	Cumberland
Foy Roberson	Durham	Durham
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W. Frank Taylor	Goldsboro	Wayne
Mrs. May L. Tomlinson	High Point	Guilford
F. E. Wallace	Kinston	Lenoir
Graham Woodard	Wilson	Wilson

## Term Expiring April 1, 1951

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\* Appointed April 1, 1945.

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Captain, Infantry-Reserve; B.S., Clemson College.

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**‡FRANCIS COOLIDGE BRAGG, Instructor in Mechanical Engineering.**  
B.S. in M.E., Worcester Polytechnic Institute; M.S., Syracuse University.

<sup>†</sup> On leave.

<sup>‡</sup> On military leave.

<sup>\*</sup> Resigned.

<sup>\*\*</sup> Resigned March 1, 1945.

- CHARLES RAYMOND BRAMER, *Associate Professor of Structural Engineering.*  
B.S., E.M., Michigan College of Mining and Technology.
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- THEODORE CECIL BROWN, *Associate Professor of Mechanical Engineering.*  
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- THOMAS EVERETTE BROWNE, *Director of the Division of Teacher Education.*  
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- WILLIAM HAND BROWNE, JR., *Professor of Electrical Engineering.*  
A.B., P.A.E., B.E., Extra Ordinem, Johns Hopkins University.
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- ROBERTS C. BULLOCK, *Associate Professor of Mathematics.*  
A.B., M.A., University of North Carolina; Ph.D., University of Chicago.
- LELAND BURKHART, *Assistant Professor of Agronomy.*  
B.S., Ohio State University; M.S., University of New Hampshire; Ph.D., University of Chicago.
- MALCOLM EUGENE CAMPBELL, *Dean of the School of Textiles.*  
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B.S., University of Kentucky.
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A.B., Trinity College; M.A., Duke University.
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A.B., M.A., Ph.D., University of Illinois.
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B.S., Pennsylvania State College; M.F., Yale University.
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Major, Infantry-Reserve, AUS; Graduate, British Machine Gun School; Graduate, Third Corps School; Graduate, Infantry School, Company Officers Course.
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B.A., Columbia University; M.A., Harvard University.
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B.S. in Agriculture, Ohio State University; M.S., N. C. State College.
- JAMES KIRK COGGIN, *Professor of Agricultural Education.*  
B.S., N. C. State College; M.S., Cornell University.

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† On military leave.

‡ On leave.

**EMERSON R. COLLINS**, *Associate Professor of Agronomy.*  
B.S., Pennsylvania State College; Ph.D., Iowa State College.

**NORVAL WHITE CONNER**, *Associate Professor of Fluid Mechanics.*  
B.S., M.E., Virginia Polytechnic Institute; M.S., Iowa State College.

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B.S. in M.E., B.S. in Ind. Educ., M. Ed., Pennsylvania State College.

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B.S., M.S., N. C. State College.

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and Tactics.*  
Captain, Infantry Reserve, AUS; B.S., Clemson College.

**RALPH WALDO CUMMINGS**, *Professor of Agronomy; Assistant Director, Agri-  
cultural Experiment Station.*  
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†**PHILIP HARVEY DAVIS**, *Assistant Professor of English.*  
A.B., A.M., Miami University.

**ROY STYRING DEARSTYNE**, *Professor of Poultry Science.*  
B.S., University of Maryland; M.S., N. C. State College.

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B.S., M.S., University of Tennessee; Ph.D., University of Chicago.

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B.S., M.S., Ph.D., University of California.

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B.A., M.A., Wake Forest College.

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B.S., Clemson College.

†**JOSEPH NEWTON FARLOW**, *Instructor in Engineering Mechanics.*  
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†**CHARLES EDWARD FELTNER**, *Assistant Professor of Engineering Mechanics.*  
B.S., Virginia Polytechnic Institute; S.M.C.E., University of North Carolina.

**HILBERT ADAM FISHER**, *Professor of Mathematics.*  
M.S., N. C. State College; graduate, United States Naval Academy; graduate, United States Submarine School; L.L.D., Lenoir Rhyne College.

†**GASTON GRAHAM FORNES**, *Assistant Professor Mechanical Engineering.*  
B.S., M.S., N. C. State College.

**GARNET WOLSEY FORSTER**, *Professor of Agricultural Economics.*  
B.S., Cornell University; M.S., Ph.D., University of Wisconsin.

**JOHN ERWIN FOSTER**, *Professor of Animal Husbandry and Dairying.*  
B.S., N. C. State College; M.S., Kansas State College; Ph.D., Cornell University.

**ALVIN MARCUS FOUNTAIN**, *Associate Professor of English.*  
B.E., M.S., N. C. State College; M.A., Columbia University; Ph.D., Peabody College.

**RAYMOND SPIVEY FOURAKER**, *Professor of Electrical Engineering.*  
B.S., A. & M. College of Texas; M.S., University of Texas.

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† On military leave.

- WILLIAM GEORGE FRIEDRICH, Visiting Professor of Industry.**  
M.M.E., Dr. of Technical Sciences, Polytechnical University of Prague; M.Ae.E., Ecole Nationale Aeronautique (Paris).
- BENTLEY BALL FULTON, Professor of Entomology.**  
B.A., Ohio State University; M.S., Chicago University; Ph.D., Iowa State College.
- MONROE EVANS GARDNER, Professor of Horticulture.**  
B.S., Virginia Polytechnic Institute.
- HERMAN CHRISTIAN GAUGER, Associate Professor of Poultry Science.**  
B.S., Connecticut State College; M.S., N. C. State College.
- GEORGE WALLACE GILES, Associate Professor of Agricultural Engineering.**  
B.S., University of Nebraska; M.S., University of Missouri.
- KARL B. GLENN, Associate Professor of Electrical Engineering.**  
B.E., M.S., N. C. State College.
- JAMES HENRY GRADY, Assistant Professor of Architecture.**  
B. Arch., Ohio State University.
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B.S., Wake Forest College; B.S., N. C. State College.
- †**ARTHUR FREDERICK GREAVES-WALKER, Professor of Ceramic Engineering.**  
Cer.E., Ohio State University; D.Sc., Alfred University.
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B.S., Cornell University; M.S., N. C. State College.
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B.S., M.S., North Carolina State College; Ph.D., Cornell University.
- †**DAVID WOLTER GREGORY, Instructor in Poultry Science.**  
B.S., Kansas State College; M.S., N. C. State College.
- WALTON CARLYLE GREGORY, Assistant Professor of Agronomy.**  
B.A., Lynchburg College, M.A., Ph.D., University of Virginia.
- ALBERT HARVEY GRIMSHAW, Professor of Textile Chemistry and Dyeing.**  
Graduate of the New Bedford Textile School; B.S., M.S., N. C. State College.
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B.S., M.S., University of Minnesota; D.V.M., Cornell University.
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B.S. in M.E., M.S. in M.E., Virginia Polytechnic Institute.
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B.S., Massachusetts Institute of Technology.
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B.S., University of Maryland; M.S., N. C. State College.
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A.B., Oberlin College; M.A., University of North Carolina.
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B.A., Southern Methodist University; M.S., Texas A. & M. College; Ph.D., University of North Carolina.
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A.B., Calvin College; Ph.D., Duke University.
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B.S., Citadel; Ph.D., Johns Hopkins University; LL.D., Citadel.
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B.S., T.E., M.S., N. C. State College.
- †**LODWICK CHARLES HARTLEY, Professor of English.**  
B.A., Furman University; M.A., Columbia University; Ph.D., Princeton University.

† On military leave.

- ARTHUR COURTNEY HAYES, Assistant Professor of Textile Chemistry and Dyeing.**  
Ph.B., Brown University; M.S., N. C. State College.
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- \*JAMES HAROLD HILTON, Professor of Animal Industry.**  
B.S.A., Iowa State College; M.S., University of Wisconsin.
- JOHN THOMAS HILTON, Professor of Yarn Manufacturing.**  
Diploma Bradford Durfee Textile School; B.S., M.S., N. C. State College.
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A.B., University of Alabama; Ph.D., Louisiana State University.
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B.S., M.S., Ph.D., Massachusetts State College.
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- CLAUDE MILTON LAMBE, Assistant Professor of Civil Engineering.**  
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† On leave.

† On military leave.

\* Appointed February 1, 1945.

\*JOHN HAROLD LAMPE, *Dean of the School of Engineering.*  
B.S., M.E., D.E.E., Johns Hopkins University.

FORREST WESLEY LANCASTER, *Associate Professor of Physics.*  
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B.S., Oregon State College; M.S., Ph.D., University of Minnesota.

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B.S., M.S., University of Minnesota; Ph.D., Columbia University.

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JOHN ANTHONY LEIPOLD, *Instructor in Military Science and Tactics.*  
Master Sergeant, DEML, U. S. Army.

PAUL BONAR LEONARD, *Instructor in Mechanical Engineering.*  
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†JACK LEVINE, *Associate Professor of Mathematics.*  
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‡JAMES EADS LEVINGS, *Assistant Professor of Engineering Mechanics.*  
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JOHN GARY LEWIS, *Associate Professor of Knitting.*  
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JOHN ROBERT LUDINGTON, *Professor of Industrial Arts Education.*  
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CHARLES WALKER MADDISON, *Foreman of Foundry.*

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ROGER POWELL MARSHALL, *Professor of English.*  
B.A., Wake Forest College; M.A., Columbia University; M.S., N. C. State College.

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† On military leave.

‡ On leave.

\* Appointed April 1, 1945.

FREDERICK HAROLD McCUTCHEON, *Professor of Zoology.*  
 B.S., M.S., North Dakota State College; Ph.D., Duke University.

DOUGLASS NEWMAN McMILLIN, *Professor of Military Science and Tactics.*  
 Colonel, Infantry, U. S. Army; Graduate, Infantry School, Company Commander's Course.

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JEFFERSON SULLIVAN MEARES, *Associate Professor of Physics.*  
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JOHN FLETCHER MILLER, *Professor of Physical Education and Athletics.*  
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 B.S., M.S., University of North Carolina.

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THOMAS NELSON, *Dean Emeritus of the School of Textiles.*  
 D.Sc., N. C. State College.

JOHN HERVEY NICHOLS, *Laboratory Technician, Department of Electrical Engineering.*  
 B.S., M.E.E., N. C. State College.

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† On military leave.

\*\* Resigned Feb. 1, 1945.

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**HUBERT VERN PARK**, *Associate Professor of Mathematics.*  
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**JAMES RODNEY PILAND**, *Assistant Professor of Agronomy.*  
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**JOSHUA PLUMMER PILLSBURY**, *Professor of Landscape Architecture.*  
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**†JOSEPH ALEXANDER PORTER, JR.**, *Assistant Professor of Weaving and  
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**EDMUND WESLEY PRICE, JR.**, *Instructor in Civil Engineering.*  
B.C.E., N. C. State College.

**GLENN ORVICE RANDALL**, *Associate Professor of Horticulture.*  
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**EDGAR EUGENE RANDOLPH**, *Professor of Chemical Engineering.*  
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**MARL ELLIS RAY**, *Instructor in Civil Engineering.*  
B.S., N. C. State College.

**WILLIS ALTON REID**, *Associate Professor of Chemistry.*  
B.S., Wake Forest College; Ph.D., Wisconsin University.

**ROBERT BARTON RICE**, *Professor of Mechanical Engineering.*  
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**JACKSON ASHCRAFT RIGNEY**, *Associate Professor of Agronomy and Experi-  
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**MACON ROGERS ROWLAND**, *Assistant Professor of Mechanical Engineering.*  
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<sup>†</sup> On military leave.

\* Deceased.

- IRA OBED SCHAUB, *Dean of the School of Agriculture and Forestry and Director of Agricultural Extension.*  
B.S., N. C. State College; D.Sc., Clemson College.
- †ROBERT SCHMIDT, *Associate Professor of Horticulture.*  
B.Sc., Rutgers University.
- †HERBERT FREDERICK SCHOOF, *Instructor in Zoology and Entomology.*  
B.S., M.S., N. C. State College; Ph.D., University of Illinois.
- WAYLAND PRITCHARD SEAGRAVES, *Assistant Professor of Mathematics.*  
B.S., M.S., N. C. State College.
- LOUIS WALTER SEEVERS, *Assistant Professor of History.*  
A.B., Muhlenberg College; A.M., University of Pennsylvania.
- ‡JOHN FRANK SEELY, *Assistant Professor of Chemical Engineering.*  
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- WALTER EUGENE SELKINGHAUS, *Associate Professor of Mechanical Engineering.*  
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- †JAMES ATKINS SHACKFORD, *Instructor in English.*  
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- ALFRED BERNARD ROWLAND SHELLEY, *Assistant Professor of English.*  
B.S., Tufts College; A.M., Harvard University.
- †MARSHALL LEROY SHEPHERD.  
B.S., N. C. State College; M.A., Cornell University.
- WILLIAM EDWARD SHINN, *Professor in Charge of Knitting Section.*  
B.S., M.S., N. C. State College.
- MERLE FRANKLIN SHOWALTER, *Associate Professor of Chemistry.*  
A.B., Indiana University; M.S., Purdue University.
- CLARENCE B. SHULENBERGER, *Professor of Accounting.*  
A.B., Roanoke College; A.M., Columbia University.
- ROSS EDWARD SHUMAKER, *Professor of Architecture.*  
B.Arch., Ohio State University; Registered Architect.
- IVAN VAUGHAN DETWEILER SHUNK, *Professor of Botany.*  
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- GEORGE KELLOGG SLOCUM, *Associate Professor of Forestry.*  
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- BENJAMIN WARFIELD SMITH, *Associate Professor of Agronomy.*  
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- CLYDE FUHRIMAN SMITH, *Assistant Professor of Entomology.*  
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- GEORGE WALLACE SMITH, *Professor of Engineering Mechanics.*  
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- JOHN WARREN SMITH, *Professor of Industrial Education.*  
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- †RAYMOND FRANKLIN STAINBACK, *Assistant Professor of Physics.*  
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- ROSS OLIVER STEVENS, *Professor of Zoology.*  
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- †ROBERT EDWARD STIEMKE, *Associate Professor of Civil Engineering.*  
B.S. in C.E., M.S. in C.E., University of Wisconsin.
- EDWARD HOYLE STINSON, *Instructor in Mechanical Engineering.*  
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- ROBERT LEGRANDE STONE, *Associate Professor of Ceramic Engineering.*  
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† On leave.

† On military leave.

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**JASPER LEONIDAS STUCKEY**, *Professor of Geology.*  
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**PAUL PORTER SUTTON**, *Assistant Professor of Chemistry.*  
Ph.D., Johns Hopkins University.

**HORACE CARTER THOMAS**, *Instructor in Military Science and Tactics.*  
Master Sergeant, DEML, U. S. Army.

**EUGENE SANFORD TOWERY, JR.**, *Assistant Professor of Military Science and Tactics.*

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**†ROBERT WESLEY TRUITT**, *Instructor in Aeronautical Engineering.*  
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**WILLIAM GARDNER VAN NOTE**, *Professor of Metallurgy.*

Ch.E., Rensselaer Polytechnic Institute; M.S., University of Vermont; Ph.D., Pennsylvania State College.

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**JAMES GRAY WEAVER**, *Associate Professor of Horticulture.*  
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**BERTRAM WHITTIER WELLS**, *Professor of Botany.*  
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**FRED BARNETT WHEELER**, *Professor of Practical Mechanics and Superintendent of Shops.*  
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**RAYMOND CYRUS WHITE**, *Instructor in Chemistry.*  
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NORWOOD WADE WILLIAMS, *Assistant Professor of Poultry.*  
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ARTHUR JOHN WILSON, *Professor of Analytical Chemistry.*  
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THOMAS LESLIE WILSON, *Assistant Professor of English.*  
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MERLE WESLEY WING, *Instructor in Zoology.*  
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EDWIN WEEMS WINKLER, *Assistant Professor of Electrical Engineering.*  
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†ROBERT BAKER WYNNE, *Instructor in English.*  
A.B., William and Mary.

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† On military leave.

## GENERAL INFORMATION

### THE COLLEGE

**Establishment.**—The North Carolina State College of Agriculture and Engineering is one of the Land-Grant Colleges established under the provisions of the Morrill Act, passed by the Congress of the United States, June 2, 1862. The first session of the College was that of 1889-1890. Prior to that date, the funds received by the State under the Land-Grant Act had been used by the University of North Carolina, at Chapel Hill.

The name, The North Carolina College of Agriculture and Mechanic Arts, used in the establishment of the College, was changed by the General Assembly—the Legislature of the State—in 1917 to its present form.

In its session of 1931, the General Assembly passed an Act, of which the following is the first section: "That the University of North Carolina, the North Carolina State College of Agriculture and Engineering, and the North Carolina College for Women are hereby consolidated and merged into 'The University of North Carolina'."

This Act placed the three institutions under one Board of Trustees and one President, the separate affairs of each institution being in charge of its own Administrative Dean. The effect of the Act, by correcting unnecessary duplication and focalizing the work of each of its members, has tended to create a strong, unified State University.

**Location.**—State College Campus of one hundred twenty-five acres, lies within the limits of Raleigh, a mile and a quarter west of the State Capitol, on United States Highway, Route 1. Adjoining the Campus westward, occupying four hundred forty-five additional acres, are the College poultry yards, and the Central State Experiment Farms. A mile still farther westward, the College has acquired a tract of thirteen hundred acres, which is maintained as livestock farms by the Department of Animal Husbandry and Dairying. The part of this tract—about 500 acres—not adapted for these farms is being used by the Department of Forestry for demonstrations and development.

**Organization.**—The organization of State College has as its objectives Campus Teaching, Extension Teaching, and Research.

Campus Teaching occupies the School of Agriculture and Forestry, the School of Engineering, the Division of Teacher Education, the Textile School, the Graduate Division, the Basic Division, and the Summer Session. The Schools and the Basic Division are organized for teaching by Departments. The details of the organization, the equipment, and the work of each School and Department are given under the various headings in the later pages of this Catalog. The work of the Summer Session is set forth in a special issue of STATE COLLEGE RECORD published each year in December, a copy of which is sent on request.

The Department of Military Training, including as the Reserve Officers Training Corps students of all classes in all Schools, is placed immediately under the College Administration.

Extension Teaching is directed under the Division of College Extension. The work is closely coördinated with the work in the regular Departments of the College. In certain short courses, most of them in Agriculture and in Engineering, Extension overlaps with Campus Teaching. The whole State is covered in the activities of the Agricultural Extension Service.

Research is conducted, by individuals or by Departments, very generally at State College. Specially organized work is done through the Agricultural Experiment Station, the Engineering Experiment Station, and the Textile Research Department.

**The Campus.**—The Campus of State College presents an agreeably rolling terrain with adequate space west and south for expansion. Located on the eastern edge of the Piedmont Region of the State, within twenty-five miles of the Coastal Plain, opportunity is afforded for a pleasing variety of trees and shrubs in the landscaping. Fortunately, in the early years of the College a long-range plan for growth was made. This plan is now being intelligently followed.

Under the sections of the Catalog devoted to Schools and their Departments and to Divisions, are placed descriptions of buildings, laboratories, and facilities of each of these.

**General Service Buildings.**—Holladay Hall, named for Colonel Alexander Quarles Holladay, first President of the College, 1889-1899, contains the general administrative offices of the College, and the offices and classrooms of the Military Department.

The D. H. Hill Library, named for Doctor Daniel Harvey Hill, President of the College, 1908-1916, was dedicated in 1926. It contains now over 62,000 volumes, exclusive of Government documents, and pamphlets.

The Y. M. C. A. building, the erection of which was made possible by a donation from the Rockefeller Foundation, serves the religious and social life of the College.

The Dining Hall, an H-shaped building, with kitchens, storage rooms, pantries, refrigerators, and other mechanical devices in the center and basement, has at each side, front and rear, a spacious dining hall. The service is on the cafeteria plan.

The Frank Thompson Gymnasium, named in honor of Frank Martin Thompson, distinguished athlete, graduate of State College, Class of 1910, killed in service during the World War, is thoroughly equipped and modern in all its appointments.

The Infirmary, recently enlarged and renovated, is a model of a small, special hospital.

Pullen Hall, named in honor of R. Stanhope Pullen, donor of first sixty acres of the College land, has classrooms on the first and basement floors, on the second floor, the College auditorium.

The Power Plant, recently erected, centrally located, furnishes heat, electric power, and hot water to all buildings on the Campus using these services.

Eleven College Dormitories now in use accommodate approximately 1400 students. Other students will room, as at present, in homes in the vicinity of the Campus and in fraternity houses. Full information in regard to dormitories is sent by the Registrar to applicants accepted for admission to the College, or by the Superintendent of Dormitories.

## INFORMATION FOR APPLICANTS

### I. Admission

1. The first step toward admission to State College is to get from the Registrar, who is to be addressed at State College Station, Raleigh, a certificate blank. After the blank has been filled out and signed by the principal or the superintendent of the high school or other preparatory school, the certificate is sent to the Registrar for his decision on admission, notice of which will be given promptly.

The certificate must contain a statement from the school last attended of the good moral character of the applicant.

2. Undergraduate students may be admitted as regular or special.

- (1) A regular student is one who is registered in a four-year curriculum.
- (2) Women may be admitted as regular students provided they register in one of the regular curricula.
- (3) A special student is a person of mature age already engaged in some vocation in which instruction is desired. Such person may, upon presenting a satisfactory record of education and upon recommendation of the Dean of the School concerned, be admitted without the usual entrance requirements.

Special students are not eligible for a degree, nor does work done as a special student have value for credit toward a degree. A special student cannot represent the College in any intercollegiate contest nor become a member of a fraternity.

3. Requirements for admission of regular students.

- (1) Sixteen years is the minimum age for admission.
- (2) Graduation from a State accredited high school, or an approved preparatory school, and fifteen units of credit, specified and elective as indicated below, are required for admission to the freshman class of four-year courses.
- \* (3) Nongraduates who have completed the eleventh grade may be admitted under the following conditions:
  - (a) If they have the specified subject requirements and units of credit indicated below.
  - (b) If they are in the upper third of their class scholastically.
  - (c) If they have the principal's recommendation.
  - (d) If they pass successfully the College entrance examination.

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\* This method of admission is experimental and its continuance will depend upon the results obtained.

- (4) Applicants graduated by nonaccredited four-year high schools may be admitted by passing successfully an entrance examination such as that prepared by the Examination Committee of the North Carolina College Conference.
- (5) In exceptional instances a person of mature age may be admitted by the Dean of a School on the basis of his ability to carry the regular work of a curriculum in that School.
- (6) Subjects and units of credit (a unit is allowed for a subject pursued for a year, five periods a week, each period being at least forty minutes, and successfully passed in a high school accredited by the North Carolina State Department of Public Instruction or other preparatory school accredited by competent authority).

Units of Credit

English: Grammar, Composition, Literature .....	4
†History: United States or equivalent .....	1
Algebra .....	1.5
Plane Geometry .....	1
*Solid Geometry .....	.5
Science .....	1

The remainder of the required fifteen units will be accepted from the academic record presented except that not more than a total of one unit will be accepted for activity courses such as physical education, music, band, and military science.

- (7) Students admitted from other countries who do not have a satisfactory command of the English language will be required to attend a non-credit English course until they acquire a mastery of English. This course will include vocabulary training in the student's major field of study.
4. Advanced standing is allowed on work done in approved colleges upon presentation of a certificate or transcript, duly signed and sealed, to the Director of Registration. The transcript is evaluated in the Registration Office to determine the maximum amount of credit and is then sent to the Dean of the School concerned for a detailed evaluation of credits which can be used in the curriculum selected.

Each applicant for admission to N. C. State College as a transfer from another college or a university must send with her or his application for admission a remittance of five dollars, to be known as the application fee. This remittance must be drawn in favor of N. C. State College, Raleigh, and should be in the form of a check or money order. No transcript of record sent in support of an application for admission will be examined and evaluated until the remittance is received. If the record received is not satisfactory for the applicant's admission, the remittance will be returned;

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\* Solid Geometry is required only in the School of Engineering and in Agricultural Engineering. A special course is offered in college for applicants who do not present this credit for entrance. No college credit is allowed for the course.

† A student not offering for credit History of the United States is required to take the subject in his College course.

if the record is satisfactory and the application is approved, the remittance will be deposited with the Cashier and will be applied as a credit at the time of the applicant's first registration. If the record is satisfactory and the application is approved and the applicant fails to matriculate at N. C. State College, the deposit is forfeited by the applicant.

Because of the scholastic requirements imposed upon resident students, advanced standing credit cannot be allowed for courses passed at other institutions with the lowest passing letter grade, or corresponding numerical grades. At least one year in residence is required for a degree.

## II. Expenses

### Undergraduate

1. The total College expenses of a student resident of North Carolina need not for the regular College year exceed \$600.00, for a nonresident of this State, \$770. These amounts include the cost of room and board, heat and lights, tuition, fees and deposits, books, drawing instruments, laundry, and necessary incidentals. They do not include clothing, pocket money, or other incidentals.

2. Nonresidents of North Carolina pay an additional tuition charge. The College Administration has defined a nonresident student as a person who comes into North Carolina from another state for the purpose of attending college.

In order to draw a clear line between resident and nonresident students, the Administration has ruled that all students whose parents have not been domiciled in North Carolina for more than six months immediately preceding the day of their first enrollment in the institution shall be termed non-resident students, with the following exceptions:

- (1) Students twenty-one years of age at the time of their first matriculation who have resided in North Carolina for more than one year preceding the day of their first enrollment.
- (2) Children of regular employees of the Federal Government stationed in the State of North Carolina.
- (3) Children of regular employees of the Federal Government who are employed outside of the State, but who through law are permitted to retain their North Carolina citizenship.

Students cannot claim a change in their resident status after matriculating. Students furnishing incomplete or incorrect information in order to obtain the special State-resident status shall be liable for dishonorable dismissal.

3. Applications for credit must be made to the Business Office of the College, prior to registration day. Applications made later, if granted, will require a special fee of \$2 and possibly also the fee for late registration.

4. For each failure to meet deferred payments as scheduled, a fee of \$5 is charged.

5. Tuition and fees for residents of North Carolina as regular undergraduates or as special students scheduled for twelve or more credit hours are as follows:

	Fall Quarter	Winter Quarter	Spring Quarter
Tuition .....	\$30 .....	\$30 .....	\$30 .....
College Fees .....	25 .....	25 .....	25 .....
Student Activities .....	4 .....	3 .....	2 .....
Athletic Fee .....	8 .....	5 .....	2 .....
Agricultural, and Agricultural Education Students Fees .....	2 .....	2 .....	.....
Engineering Students Fees* .....	2 .....	1 .....	.....
Textile Students Fees .....	2 .....	1 .....	.....
General Deposit .....	20 .....	.....	.....

Special Student Fees include subscription to student publications of the school in which registered.

Note.—Tuition and Fees are subject to change by the Board of Trustees without advance notice.

6. The general deposit, in case of first year men, will be charged with cost of necessary expendable Military Supplies, such as shoes, books, etc. The balance of this deposit, in case of all students, is refundable at the end of the year, after covering loss of, or excessive breakage of College property, or other indebtedness to the College.

7. Nonresidents of North Carolina registered in Forestry or Textiles will pay an additional \$38.00 Tuition per quarter. Nonresident students registered in other curricula will pay an additional \$55.00 Tuition per quarter.

8. Expenses include also the following:

	Fall Quarter	Winter Quarter	Spring Quarter
Room Rent .....	\$18.00 to \$30.00 ..	\$18.00 to \$30.00 ..	\$18.00 to \$30.00 ..
Books and Supplies .....	20.00 to 35.00 ..	8.00 ..	.....
Drawing Equipment for those taking Drawing .....	17.50 to 35.00	.....	.....

9. College fees include those for registration, for hospital and medical attention, for library and lectures, for laboratories and classrooms, and for physical education.

10. Student-activities fees include those for student government, student publications, and general student activities.

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\* Of the Engineering fee of \$3, the students pay \$1 for a year's subscription to "The Southern Engineer."

11. Freshmen, unless living at home with their parents, are required to room in specified College dormitories. Students are not permitted to live in fraternity chapter houses during their freshman year.
12. Reservation of a room and the first payment of rent must be made before August 15 to obtain the most desirable room available. A reservation may be canceled and the payment therefore refunded upon notice before September 1, not later. Information about rooms may be had by writing Superintendent of Dormitories.
13. Dormitory rooms have necessary furniture, but each student must bring his own blankets, bed linen, and towels.
14. Board at the College Cafeteria may be paid in cash for each meal, or in tickets sold at the Cafeteria in books of \$5.00 value for the convenience of students.
15. Applicants who desire information regarding part-time employment should address their inquiries to the Self-Help Secretary. The Self-Help Secretary will, upon request, write of possible employment to those wishing to earn, while in College, money to help in paying expenses.
16. A refund of the amount paid the College, less the registration fee and a reasonable charge for lodging and services, is made to a student withdrawing within ten days from the date of registration; on withdrawal later, no refund will be made except of the general deposit.

#### Graduate and Special Students

1. Graduate students in residence will pay a \$2.00 registration fee for each registration, \$3.00 per credit hour for all courses scheduled, and \$10.00 for the diploma.
2. Special students will pay a \$2.00 registration fee for each registration and \$3.00 (\$5.00 for non-residents) per credit hour for all courses scheduled totaling less than twelve hours. Those scheduling 12 hours or more will pay regular fees. Special students do not receive academic credit.
3. The candidate for a professional degree will pay \$10.00 when he registers and \$15.00 for his diploma.

#### III. Registration

1. A program of exercises during the first week is given each applicant for admission to the freshman class on his arrival upon the Campus.
2. The Certificate of Admission approved beforehand by the Registrar for the School and the Department in which the applicant wishes to register must be ready for presentation.
3. The dates indicated in the College Calendar for the registration of freshmen, of those applying for advanced credit, and of sophomores, juniors, seniors, and graduate students, must be strictly observed.
4. For registration after the scheduled date, an extra fee of \$2 is required for the first day and \$1 for each additional day until a maximum of \$10 is reached.

**Special Note to Freshmen and Transfer Students**

Because of the testing program given during freshman week to all new students (except those with forty-five or more term credits of advanced standing), it is essential that all new students report on time. Late admissions cause a great deal of extra labor and expense. Therefore, beginning with the fall term registration in September, 1945, all new students (except transfer students with forty-five or more term credits of advanced standing) will be charged a \$2 fee for each test missed during freshman week. This charge is made because of the extra time which must be given to late individuals. The regular late fee regulations will apply to transfer students having forty-five or more term credits of advanced standing, who do not begin their registration on the date indicated. New students should plan to arrive on the campus on the day preceding the registration date in order to be available at 8:00 a.m. on registration day.

5. Directions in detail for registration are furnished each student on entering the registration room—the Gymnasium.

6. Vaccination against smallpox is required at the time of registration unless the applicant furnishes a doctor's certificate indicating he has been successfully vaccinated within two years preceding his registration.

7. Inoculation against typhoid fever, though not compulsory, is urgently suggested for those entering the College. Free inoculation is offered by the College to all students.

8. All new students will be given the Tuberculin Skin Test unless they present a statement from their family physician indicating that such a test has been taken during the past year.

9. Admission to classes is permitted only after complete registration certified on the official card of the Registrar. All instructors will enforce this rule.

10. Students may drop and add courses during a specified period at the beginning of each term by filing in the Office of Registration a roster change slip signed by their Dean, Adviser, and the instructors concerned. There is a charge of fifty cents for such changes made after registration day. Credit is not allowed for changes unless made in this manner.

11. Students may change from one curriculum to another by filing in the Office of Registration a curriculum change card signed by the Dean or Deans concerned. Such changes are effective at the beginning of the following term.

**IV. Grades and Honor Points****1. Grading System:**

A—Excellent, 90-100.

B—Good, 80-89.

C—Passing, 70-79.

D—Passing (without credit points), 60-69.

F—Failure, below 60.

Abs.—Absent from examination.

Inc.—Incomplete.

2. Honor or quality points are determined by the grade:  
A—3 points for each credit hour.  
B—2 points for each credit hour.  
C—1 point for each credit hour.  
D—No points.
3. Mid-term reports for students who are failing any subject enable advisers and deans so to adjust the work of these students that they make, if possible, passing grades by the end of the term.
4. Seniors who fail a course within three terms (summer school counts as one term) of their graduation, may, if they have failed only one course, apply to the Office of Registration for permission to remove the failure by taking a re-examination on that course.
  - a. If, however, a senior fails more than one course during one term and removes all but one of these deficiencies by repeating the course or courses and if he has had no other re-examination that year, he may apply at the end of his last term in residence for permission to take a re-examination to remove that failure.
  - b. Permission to take any re-examination must be obtained from the Office of Registration, and a fee of \$3.00 must be paid to the Business Office for each re-examination.

#### V. Scholarship

1. To register for a new term, a freshman must have passed during the preceding term at least fifty per cent of his credit hours; a sophomore, a junior, a senior, sixty per cent. However, a student who has failed to make the required percentage may be permitted to register upon recommendation of the Scholarship Committee and the approval of the Faculty Council.
2. The re-entrance, after the interval of at least one term, of a student who has failed, or the entrance, after the lapse of at least one term, of a student who has failed at another college, shall be determined by the Dean or Director of Instruction of his school upon the basis of maximum scholastic advantage to the student.
3. "C" Average Rule. Before allowing students to enter the third or fourth year, they shall have earned net credit points equal to or greater than the term credits earned. In case of repeated courses, the repeated grade only shall be considered. This rule is applied before the fall term registration only, thus giving students ample time to earn the required points. Any student may attend the summer session at this institution to make up any shortage in points, but may not earn such points through correspondence courses or attendance at other institutions.
4. Honors in Scholarship:
  - a. Honors in scholarship for the year are awarded those students who earn twice as many credit points as credit hours during the first two terms.

- b. High honors in scholarship for the year are awarded those students who earn two and one-half times as many credit points as credit hours during the first two terms.
- c. Honors in scholarship at graduation are awarded those students who have earned during their entire residence at this institution twice as many credit points as credit hours.
- d. High honors in scholarship at graduation are awarded those students who have earned during their entire residence at this institution two and one-half times as many credit points as credit hours.
- e. Public announcement of honors and high honors for the year is made on Scholarship Day; of graduation with honors or high honors at Commencement. Graduation with honors or high honors is also published in the College Catalog and engrossed upon diplomas.
- f. Dean's List. Any junior or senior having a cumulative average of "B" or better shall be exempt from the college rule which places a student on probation for excessive absences, and his name shall be placed on a preferred list. Once placed on such preferred list a student must maintain an average of "B" or better during each term he remains in college thereafter, or his name shall be removed from such preferred list and not entered thereon again.
- g. Class Attendance Regulations. A student is expected to attend every meeting of each class. Any student who is absent from class three (3) times without a satisfactory reason will lose one (1) quality point. A student who is absent ten (10) times in any term without a satisfactory reason will be placed on probation.

Copies of attendance regulations in detail are available to all students in the Office of Dean of Students.

## VI. Classification of Students

- 1. For the convenience of the college administration and in keeping with custom, regular students are classified as Freshmen, Sophomores, Juniors, Seniors, and Graduates. This classification is made only at the opening of the fall term, or when a student enters for the first time. The following system of classification is used:

Freshman—Less than 45 term credits.

Sophomore—45 credits through 104 credits.

Junior—105 credits through 159 credits.

Senior—160 or more credits.

Graduate—A student who has already received a baccalaureate degree from a recognized college.

This system permits students to skip classifications and graduate as soon as scholastic requirements have been satisfied.

- 2. Students are promoted from the Basic Division to technical schools when they have earned 105 or more credits, including credit for all freshman requirements, and have a "C" average. Students who have earned as

many as 140 credits without completing all freshman requirements are promoted to technical schools but must complete the remaining freshman courses without credit toward graduation. Transfer students are allowed at least four terms in which to make up freshman deficiencies and still receive credit toward graduation.

## VII. Degrees

1. Upon the undergraduate student who successfully completes in regular order any of the prescribed curricula the College awards a Bachelor's degree in the student's major field.
2. Upon the student who has previously obtained the Bachelor's degree and who successfully completes in regular order at least one year of prescribed graduate work in residence, the College awards a Master's degree in that student's major field.
3. The degree of Doctor of Philosophy in certain specified departments is offered in cooperation with the University at Chapel Hill under supervision of the Graduate School of the Consolidated University of North Carolina.
4. Upon graduates of State College, after five years of professional practice and significant accomplishment, a professional degree in the school concerned may be conferred upon presentation of an acceptable thesis.
5. Since in conferring a degree and awarding a diploma, the College recognizes a student's character as well as his scholarship, the College reserves the right to withhold the degree and diploma for reasons other than unsatisfactory scholarship.
6. No student may earn more than one baccalaureate degree at any one commencement. In order to be eligible for a second Bachelor's degree, a student must complete a minimum of 36 term credits above the requirements for the first degree. There is, however, no additional residence requirements.
7. Undergraduate students who transfer from some other institution must spend one year in residence at this institution before being eligible for a degree.
8. An undergraduate student while not in residence may earn towards a degree not more than fifty term credits by correspondence and not more than sixty by correspondence and extension. Not more than six credit hours may be earned towards graduation after a student's last residence at this institution. Correspondence courses cannot be taken by a resident student unless they are a part of his official schedule approved by his dean.
9. The honorary degree, Doctor of Science, may be conferred upon not more than three men a year, one each recommended by the schools and in the fields of Agriculture and Forestry, of Engineering, and of Textiles.
10. A certificate of Meritorious Service in Agriculture may be awarded at Commencement to a bona-fide farmer who has rendered notable service in the advancement of agriculture in his community.

### VIII. Financial Aids and Scholarships

1. The Self-Help Secretary of the College Y. M. C. A. (see page 43) will assist those desiring employment to help pay expenses.

2. A Student Loan Fund, first established by the State College Alumni Association, amounting now to \$34,000, renders assistance to needy students of talent and high character. The Fund includes the Finley Loan Fund of \$1,000 (see below), the Masonic Loan Fund, \$4,500, the Frank M. Harper Loan Fund, \$200, and the Escheats Loan Fund of \$15,000.

At present, loans, restricted largely to juniors and seniors, are made at 6 percent on good security. Since the fund is comparatively small, new loans are usually made only as old ones are repaid.

The Finley Loan Fund is a memorial to William Wilson Finley by the Southern Railway Company, of which Mr. Finley was, at the time of his death, president. It is designated for needy students in Agriculture.

3. The John Gray Blount Scholarships were endowed by Colonel W. B. Rodman, of Norfolk, Virginia, in memory of his great-grandfather. The maximum value of each of the two scholarships is \$195.

4. The Champion Paper and Fibre Company provides a fund for a Fellowship to encourage graduate study and research in Chemical Engineering.

5. The Syd Alexander Scholarship was endowed by Mrs. Mary R. Alexander of Charlotte, North Carolina, in memory of her husband, the late Sydenham B. Alexander, alumnus and trustee of State College. The returns from the endowment—\$5,000—are awarded to a student native and resident of Mecklenburg County, North Carolina, who is pursuing a course in the School of Textiles of State College.

6. The Barrett Company, Distributors of Arcadian American Nitrate of Soda, offers to 4-H Club members the following one-year scholarships:

- (1) To the member with the most distinguished record with a Corn-Club project.
- (2) To the member with the most distinguished record in Cotton-Club work.
- (3) To the member with the best Tobacco-Club record.
- (4) To the member with the best record in Horticulture.

7. The North Carolina Cottonseed-Crushers Association offers to 4-H Club members the following one-year scholarships:

- (1) To the member making the best record in the Baby-Beef contest.
- (2) To the member making the best record in a dairy project.
- (3) To the member making the best Pig-Club record.

8. (1) The Chilean Nitrate Educational Bureau offers a four-year scholarship to the 4-H Club member in North Carolina making the best record for three or more years in 4-H Club work.

(2) The Chilean Nitrate Educational Bureau also offers a hundred scholarships of \$5 each: one to the most distinguished Club boy from each of the hundred counties of North Carolina attending the 4-H Summer Short Course at State College.

9. The Luther W. Cartwright, Jr., Memorial Scholarship. Memorializing the late Luther W. Cartwright, Jr., who gave his life in the service of his country, his father, Lieutenant Commander Luther W. Cartwright, has established a trust fund at the North Carolina State College of Agriculture and Engineering to provide for the annual award of a scholarship to be awarded to a senior in the school of engineering.

10. The Abraham and Charles Erlanger Textile Scholarships. Memorializing the late Abraham and Charles Erlanger, members of their family have established a trust fund at North Carolina State College of Agriculture and Engineering to provide for the annual award of a four-year scholarship in textiles.

Any son or daughter of an employee of the Erlanger Mills, Inc., in Lexington, N. C., the North Carolina Finishing Company in Salisbury, N. C., the North Carolina Fabrics Company in Salisbury, N. C., and the Alexander Manufacturing Company in Forest City, N. C., on graduation from high school, is eligible to compete for the Erlanger Scholarship.

11. The Pieters Memorial Graduate Scholarship commemorates the life and work of Dr. Adrian J. Pieters, long a leader in agriculture and a pioneer in the development of lespedeza. It was initiated by his wife, Mary Burr Pieters, to carry forward through graduate study his work with lespedeza and other acid-tolerant legumes. The annual stipend is \$200.

12. The L. Reade Powers Scholarship Fund. Established by his brother, Dr. F. P. Powers, for the aid of needy students, primarily orphan boys or girls. This is in the nature of a loan fund to needy boys or girls.

13. Sperry Gyroscope Scholarships. The Sperry Gyroscope Company, Inc., has granted the College \$1,250 per school year for four years, beginning in September, 1945, for two scholarships each school year, or one fellowship each school year. A committee composed of the Dean of Engineering, the Dean of Students, and the Head of the Department of Aeronautical Engineering will select the persons to receive the awards. The selections will be made from students having junior class, or senior class, or graduate standing.

14. Graduate Fellowships are offered each year by State College, during the current year, thirty-three teaching, twenty-four research fellowships. As the number of these scholarships is limited, application should be made early to the Head of the Department concerned.

15. As need arises, assistants in various Departments are selected from upperclass or graduate students.

## STUDENT ACTIVITIES

### Student Government

Student Government, in accordance with an agreement between the students and the Board of Trustees of the College, undertakes "to handle all matters of student conduct, honor, and general student interest, and to promote in Campus life self-control, personal responsibility, and loyalty to the College and the student body."

The Student Council, the legislative-executive body for Student Government, is composed of one senior, one junior, and one sophomore from each of the Schools—Agriculture and Forestry, Engineering, and Textile, and the Division of Teacher Education—and one member chosen at large from the freshman class at the beginning of the second term.

For guidance in its operation, the Constitution and By-Laws for Student Government has been adopted.

### Student Publications

The Publications Board is composed of the editors and business managers of all student publications, the president and the past president of the junior class, the president of the Student Council, and five faculty members. The Board seeks to promote the interests of the College and of the publications, to insure coöperation among the publications, and to hold the loyal support of the faculty, the students, and the public.

The Technician, the student newspaper, is delivered to each student's mail box every Friday morning of the regular College session. The charge for the paper is included in the student's publications fee.

The Agromeck is the official annual published at the end of each scholastic year of the College. A copy of The Agromeck is also paid for by each student in his publications fee.

The Agriculturist, a monthly magazine in its field, was begun by the activities of the Alpha Zeta fraternity and the "Ag" Club. All students of the School of Agriculture and Forestry are concerned in this enterprise.

The Southern Engineer, the organ of the School of Engineering, is managed by the Board of Directors of the Southern Engineer. They plan to issue four numbers during the regular College session.

Pi-ne-tum is the annual of the Division of Forestry. Its contents constitute a record of persons, especially the graduating class, and of events of the year interesting to students of the Division and their friends.

The Textile Forum is published quarterly by the students in the Textile School.

### Clubs and Societies

All clubs and societies endeavor to bring together students (some clubs include members of the faculty), with the same interests or professional objective, in order to cultivate close personal relations and fellowship. Their

chief purpose is to inculcate high professional consciousness and *esprit de corps*; and, with a view toward the accomplishment of these ends, they afford to members an opportunity to hear and to participate in discussions of professional problems, and themselves to present papers on current technical topics.

The Agricultural Club, besides the usual activities, sponsors an annual dance.

The Forestry Club, having the usual program through the year, publishes its own annual, *Pi-ne-tum* (described under "Student Publications," above).

La Société des Beaux Arts includes students in Architectural Engineering and those in Landscape Architecture.

The Agricultural Engineering Club is a student branch of the national organization, The American Society of Agricultural Engineers, and brings together students of this department to discuss all phases of their specialty.

The Agricultural Education Society devotes its attention to matters of interest to students who are preparing to become teachers of agriculture.

Student Chapters in Engineering at State College represent the following national organizations:

The American Ceramic Society  
The American Institute of Chemical Engineers  
The American Institute of Electrical Engineers  
The American Institute of Mining and Metallurgical Engineers  
The American Society of Civil Engineers  
The American Society of Mechanical Engineers  
The Associated General Contractors of America  
The Institute of Aeronautical Sciences  
The National Society for the Advancement of Management  
Theta Tau, Rho Chapter (National Professional Engineering Fraternity).

The Engineers' Council, composed of three students and a professor from each Department of the School of Engineering, publishes quarterly *The Southern Engineer* and sponsors the Engineers' Fair and Exposition.

The Tompkins Textile Society endeavors to keep abreast of whatever affects the textile industry, state, national, or foreign.

The Pan American Club cultivates friendship among students of all nationalities and has regular addresses and discussions of international events and relationships.

The Monogram Club has as its purpose to develop the highest order of sportsmanship in all athletics.

#### Honor Fraternities and Societies

Honor Fraternities and Societies strive to encourage and reward high attainment in scholarship and character, and to instill lofty professional

ideals, with leadership in contribution to existing knowledge and in service as prime objectives. The following national fraternities and societies have chapters or other organizations at State College:

Alpha Zeta: Agricultural  
 Eta Kappa Nu: Electrical Engineering  
 Gamma Sigma Epsilon: Chemical  
 Kappa Phi Kappa: Teaching  
 Keramos: Ceramic Engineering  
 Lambda Gamma Delta: Agricultural Judging  
 Mu Beta Psi: Musical  
 Phi Eta Sigma: Freshman, Scholarship  
 Phi Kappa Phi: Scholarship  
 Phi Psi: Textile  
 Pi Kappa Delta: Public Speaking  
 Pi Tau Sigma: Mechanical Engineering  
 Sigma Pi Alpha: Language  
 Tau Beta Pi: Engineering  
 Blue Key: Scholarship, Leadership, Student Activities  
 Xi Sigma Pi: Forestry, Honorary.

The following are organizations peculiar to State College:

The Golden Chain: Senior Citizenship  
 The Order of St. Patrick: Senior Engineering; Collegiate and Personal Distinction  
 The Order of 30 and 3: Sophomore Leadership  
 The Pine Burr Society: Scholarship and Extracurricular Activity  
 Sigma Tau Sigma: Textile, Scholarship

#### Social Fraternities

Following are the national Greek-Letter Fraternities having chapters at State College. Each chapter occupies a chapter house in the vicinity of the campus.

Alpha Gamma Rho*	Phi Kappa Tau*
Alpha Kappa Pi*	Pi Kappa Alpha
Alpha Lambda Tau	Pi Kappa Phi
Delta Sigma Phi	Sigma Alpha Mu
Kappa Alpha*	Sigma Nu
Kappa Sigma*	Sigma Phi Epsilon
Lambda Chi Alpha	Sigma Pi
	Sigma Chi

The Interfraternity Council, composed of two representatives from each chapter, has as its purposes to advance the interests of North Carolina State College; to promote the general interests and welfare of the associated fraternities as a body; and to insure cooperation between them in their relations with the faculty, the student body, and the public in general.

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\* Inactive for the duration.

**MEDALS AND PRIZES\*\***

1. The Alpha Zeta Cup is awarded to the sophomore in Agriculture who during his freshman year made the highest scholastic average.
2. The General Alumni Association of the College presents annually a trophy to the member of the graduating class who during his College course has most distinguished himself in athletics.
3. The American Institute of Chemical Engineers presents annually its award to the sophomore who during his freshman year made the highest scholastic record.
4. The Associated General Contractors of America Prize is awarded each year by the Carolina Branch of this organization to the member of the graduating class in Construction Engineering who during his sophomore, junior, and senior years has made the highest scholastic record.
5. The Elder P. D. Gold Citizenship Medal, founded by the late C. W. Gold in memory of his father, and continued by his son, C. W. Gold, Jr., of Greensboro, North Carolina, is awarded annually to the member of the graduating class who during his sophomore, junior, and senior years has most distinguished himself in Student Citizenship. The qualities determining the award—scholarship, student leadership, athletics, and public speaking—are to be attested by the College Registrar, the Student Council, the Faculty Athletic Committee, and a committee composed of the Dean of Administration and Dean of Students.
6. The Moland-Drysdale Corporation Scholarship Cup, presented by Mr. George N. Moland, of Hendersonville, North Carolina, President of the Corporation, is awarded annually to the freshman in Ceramic Engineering who, during the two terms preceding Scholarship Day, has the highest scholastic record together with interest shown in the activities of the Department.
7. The J. C. Steele Scholarship Cup, presented by J. C. Steele and Sons, of Statesville, North Carolina, to commemorate the establishment by Mr. Steele of the first plant for the manufacture in the South of ceramic machinery, is awarded annually to the student of the three upper classes in the Department of Ceramic Engineering who has made during the three terms preceding Scholarship Day the highest scholastic record. In making the award, personality and interest in the activities of the Department are considered.
8. The Sigma Tau Sigma Cup is awarded annually to the senior in Textiles who has the highest scholastic record.
9. The Textile Colorist Medal is awarded annually to the senior who presents the best thesis on some subject in Textile Chemistry and Dyeing.
10. The National Association of Textile Manufacturers Medal is awarded annually to a senior in the State College Textile School. The award is based upon conditions outlined by the National Association.

\*\* Several of the above medals and prizes have been discontinued temporarily due to war conditions but it is expected that they will be resumed after the war is over.

11. Phi Kappa Phi, Honorary Scholarship Society, awards each year a gold medal to the senior who as a junior, a silver medal to the junior who as a sophomore, and a bronze medal to the sophomore who as a freshman, made respectively, the highest scholastic record.

12. The Mu Beta Psi Cup is awarded annually to the senior having rendered the most service to the State College musical organizations during his college career.

## PHYSICAL EDUCATION AND ATHLETICS

Professor J. F. Miller, Head

Assistant Professor C. G. Doak, Physical Education and Intramurals.

Assistant Professor T. I. Hines, Physical Education Track and Swimming Coach.

J. L. VonGlahn, Business Manager Athletics.

Rudolph Pate, Director Athletic Publicity.

W. B. Feathers, Head Coach Football, Baseball and ASTP Instructor.

Starr Wood, Assist. Football Coach and ASTP Instructor.

A. W. Thomas, Assist. Football Coach and ASTP Instructor.

E. M. Johnson, Custodian Gymnasium and Athletic Equipment.

Helen C. Croom, Secretary.

**Aims.**—In general, the Department aims are: (a) to promote a higher standard of physical fitness through "big muscle" activities; (b) to develop habits, knowledge, appreciation, and skills in desirable sports, and athletic and gymnastic procedures; (c) to develop habits of safe recreative activities to continue after graduation.

**Organization.**—The Department of Physical Education and Athletics is in the Basic Division of the College. The program of service has three sections: Physical Education, offered in various curricula, for which college credit is given; Intramural Activities, for every interested student in the College; Intercollegiate Athletics, representative of the College.

**Control.**—All activities of the Department are controlled by the College. Physical Education and Intramural Activities are under the supervision of the Dean of the Basic Division. Intercollegiate Athletic Activities are under the supervision of the Athletic Council. The Head of the Department seeks balance and coördination in the work of the three sections. He delegates the work of the staff and sees that policies of the Department are carried out by them. To the Business Manager of Athletics is delegated the responsibility for business, financial, and all other details connected with inter-collegiate contests. The members of the staff are expected to give reasonable and capable assistance in any work of the Department insofar as it does not interfere with their main specialization. They are responsible to the Head of the Department for carrying out their duties.

**Buildings and Fields.**—The Department of Physical Education and Athletics is quartered in the Frank Thompson Gymnasium. An attractive feature of the gymnasium is a white-tiled swimming pool and natatorium,

with modern filter and chlorinating systems. The new Field House, located at the south end of Riddick Stadium, is the headquarters of the football squad. Offices of the football coaching staff are located in this building. Riddick Stadium, with new concrete bleachers, seats 15,000 spectators. Freshman Field, adjacent to the Gymnasium, is used for freshman football, intramural games, physical-training classes, and varsity baseball. The new quarter-mile track, with its 220-yard straightaways is located south of the Freshman Field. It has concrete stands seating about 3,000 spectators. "Red Diamond" and "1911 Parade Field" are available for intramural contests. The College has ten excellent clay tennis courts, with some additional contemplated.

**Activities.**—The College requires all students to enroll in some type of physical activity for two years, or six full terms. The classes meet twice a week, one term credit being given for each term's work. All students are required to take a physical and a medical examination at registration and a physical fitness test. Those who are subnormal in any way are placed on the recall list. Students may receive free medical advice at any time. All freshmen are required to take the course in Health Education which meets once a week for one term. Instruction in personal hygiene is given by members of the Physical Education Staff. A swimming requirement is also made for all freshmen, which must be met before graduation.

The required physical training courses are so standardized that they are presented, instruction given, and examination required of each student on the same basis as all other college courses.

All freshmen are required to take Fundamental Activities during the fall term. At the close of this term an examination is given which, together with a physical fitness test and the student's medical examination, determines the future activities of the student. The better students will be permitted to elect controlled sports throughout the remainder of their physical education requirements. The normal group will remain in the required Fundamental Activities until such time as they qualify to enter the elective Sports Activities. A restrictive group composed of those students who have physical defects of a permanent nature will be given selected activities. In general the physical training activities fall into one of three groups: (a) Those developing condition and physical skills, (b) Those occupying recreative or leisure time, (c) Those of a corrective nature.

**Intercollegiate Athletics.**—North Carolina State College is a member of the Southern Conference, and subscribes to its rules of eligibility for all intercollegiate contests. The program consists of the organization and training of representative varsity and freshman teams in the following sports: football, basketball, baseball, track, cross-country, wrestling, boxing, swimming, tennis, golf, and rifle competition.

**Intramural Athletics.**—Activities are fostered and promoted in many lines of athletic sports for the student body. Meets, tournaments, and leagues are seasonably organized in twelve separate sports. Participation in these activities is purely voluntary; it does not receive College credit. Sports used in this program are correlated with those used in the required class work in

Physical Education. Instruction in the sports is given in the class work, and opportunity for competition is provided in the intramural program. Cups, shields, and trophies are awarded winners in these competitions.

## MUSIC

Christian D. Kutschinski, Director

Students with previous musical experience are encouraged to continue their musical activities in campus musical organizations for which they can qualify. Qualified musicians may enroll in the R.O.T.C. Band for their required military drill.

The 80-piece R. O. T. C. Band and 50-piece Drum-and-Bugle Corps furnish martial music for all military parades by the R. O. T. C. Regiment. Their R. O. T. C. drill periods are devoted to both military and musical instruction.

The 90-piece Red-Coat Band plays and marches at football games, and at other campus and civic affairs. Its membership comprises select R. O. T. C. and non-R. O. T. C. bandsmen, who rehearse three hours a week independently of the R. O. T. C. Band.

At the conclusion of the football season the personnel is reduced to a 72-piece symphonic or concert band.

The band is also subdivided into smaller units which alternate in furnishing music at pep meetings, basketball games, and on other such occasions.

The Concert Band, composed of 72 of the most proficient musicians on the campus, concentrates on the study and performance of the finest in concert music. Its activities have greatly increased the cultural growth of those participating, and have done much toward increasing appreciation of music on the campus and in the community, in addition to providing wholesome entertainment.

The Drum-and-Bugle Corps, besides functioning as a separate unit, is also combined with the band on certain occasions, giving State College a marching musical unit of 140 men, in red-and-white uniforms, acquired by contributions from students and faculty, and from interested citizens of Raleigh through the efforts of The American Legion and the Junior Chamber of Commerce.

Credit.—Juniors and seniors in the band who are not enrolled in the R. O. T. C. may obtain three term credits per year for Band when approved by the Director before registration.

The Concert Orchestra is augmented by a number of the best musicians in Raleigh to round out a symphonic instrumentation. Besides preparing concert programs, the orchestra is divided into smaller units to provide music of a lighter nature for numerous College functions.

*The Men's Glee Club* rehearses three times a week, and alternates with the orchestra and bands in giving concerts throughout the year. It has proved to be a very popular extracurricular activity, and the group is in demand for concerts out of town and at civic functions in addition to those on the campus.

A Male Quartet and small Chamber Music ensembles are encouraged.

## COLLEGE PUBLICATIONS

State College Record carries results of research and special studies by members of the faculty and, in the March issue, the annual Catalog with announcements for the following year.

Agricultural Experiment Station publishes many bulletins of research conducted by the staff. These are sent on request, free to anyone in the State.

Agricultural Extension Service issues circulars of practical information on various home and farm problems. A list of those available or any circular available is sent on request, free to citizens of the State.

The College publishes the results of experimental and research projects made by the Engineering Experiment Station and Engineering Departments of State College. Information concerning these publications may be obtained from the Director of the Engineering Experiment Station.

## HEALTH OF STUDENTS

The authorities of the College strive to protect the health of students in every way. Each student is given a thorough physical examination when he enters the College. If remedial defects are discovered, such as defective tonsils or eyes, he is advised to have these defects corrected. If the defect is such that it may be corrected by exercise, the student is placed in a special class under the supervision of the Director in the Physical Education Department of the College.

The infirmary, maintained by the College, has accommodations for 76 patients. There is a staff of eight: the College Physician, a Supervising Nurse, a Night Supervisor, four general duty nurses, and one full-time Laboratory and X-ray Technician.

A modernly equipped First-Aid Department, and a Laboratory and X-Ray Department are valuable features of the Infirmary.

The College Physician visits the Infirmary regularly once daily and more often when necessary. The Infirmary is never closed. A graduate nurse is on duty day and night. Students have free access to the Infirmary at all times.

Parents or guardians will be notified immediately by the Dean of Students in case of accident or serious illness of their sons, and no surgical operation will be performed, except in cases of extreme emergency, without full consent of parents.

The medical fee provides for students' infirmary service, general medical treatment, and the services of nurses. It does not provide for surgical operations, outside hospital care, or the services of dentists or any other specialist.

## THE GENERAL ALUMNI ASSOCIATION

H. W. Taylor, Alumni Secretary

**Purpose.**—The purposes of this organization are: to promote the growth, progress, and general welfare of State College; to foster among its former

students a sentiment of regard for one another and continuing attachment to their Alma Mater; and, to interest prospective students in attending State College.

**Membership.**—Student Associate membership is available to every student for the nominal sum of \$2.00, which covers membership for 12 months from date of payment and also includes subscription to State College News.

Active membership is available to all former students, regardless of length of stay at the college. The annual dues for active members is \$3.00, which covers membership for 12 months from date of payment and also includes subscription to State College News.

Associate membership includes those members of the College Faculty, Staff, Extension Service, Teachers of Agriculture in high schools, Experiment Station workers, and others who are elected to such membership by the Association. The annual dues are \$2.00 and include subscription to State College News.

Honorary members include such distinguished persons as are duly elected to honorary membership at the commencement meeting of the association.

**Meetings.**—The Association meets annually on Alumni Day in connection with commencement exercises.

**Reunions.**—Class reunions are held each year in connection with the annual meeting of the Association. They are scheduled so that each class has a reunion the first year, and subsequently, every five years after graduation.

**Elections.**—Officers of the association are elected by the active members between April 1 and May 15 each year. Ballots are printed in State College News.

**State College Clubs.**—Local clubs are organized in most of the counties in North Carolina and in a number of cities in other states, such as New York, Chicago, Pittsburgh, Washington, Norfolk, Newport News, Charleston, Richmond, and Atlanta. Most of them hold quarterly meeting and student associate members are invited to attend.

**State College News.**—State College News is published every month in the year by the General Alumni Association and is sent to all dues paying members. The purpose of this magazine is to keep Association members in touch with the college and with each other. It carries news about former and present students and about the college, and is well illustrated with pictures.

**The Alumni Office.**—Records of both graduates and nongraduates are kept by the Alumni Office. The master file includes information on all former students; other files are arranged geographically and by classes. Biographical files are also kept.

Serving as a medium of communication between alumni and the College, the Alumni Offices, located on the second floor of Holladay Hall, are official headquarters for alumni when they visit the campus.

## THE D. H. HILL LIBRARY

Harlan Craig Brown, Librarian, on military leave of absence.

A.B., B.S. in L.S., University of Minnesota; A.M. in L.S., University of Michigan.

Mrs. Reba Davis Clevenger, Acting Librarian.

B.L.S., University of Illinois.

Miss Christine Coffey, Circulation Librarian.

A.B., University of North Carolina; A.B. in L.S., University of Michigan.

Cloyd Dale Gull. On military leave of absence.

A.B., Alleghany College; A.B., A.M. in L.S., University of Michigan.

Miss Rachel Penn Lane, Librarian-Abstracter in charge of Textile Department Library.

A.B., University of North Carolina.

Robert Mitchell Lightfoot, Jr. On military leave of absence.

B.S., N. C. State College; M.S., University of Virginia; B.S. in L.S., Syracuse University.

Miss Foy Lineberry, Catalog Librarian.

A.B., Meredith College; B.S. in L.S., University of North Carolina.

Miss Mary Elizabeth Poole, Reference and Document Librarian.

A.B., Duke University; B.S. in L.S., University of North Carolina.

Miss Anne Leach Turner, Order Librarian.

A.B., University of North Carolina; B.S. in L.S., Columbia University.

Miss Anna Elizabeth Valentine, Periodicals Librarian.

B.S., N. C. State College; A.B. in L.S., University of North Carolina.

The D. H. Hill Library building was erected in 1926, and named in honor of a former president of North Carolina State College. It houses the main part of the book collection and provides a reading room for study and a recreational reading room where books of general interest are readily available.

This is a reference and circulating library open to students in all departments of the college. There is no limit to the number of books that a student may borrow at one time. Its resources are available, through interlibrary loan, to individuals and to other educational institutions of the city and state.

The library comprises over 70,000 volumes of books and journals, 8,000 volumes of bound federal, state and foreign documents, and a large number of unbound items. More than 900 periodicals and newspapers are received currently. The library's holdings are particularly well developed in the special fields of science and technology which are covered in the curriculum and in the research programs of the graduate school and the Agricultural Experiment Station and the Engineering Experiment Station. In addition, the library offers inspirational, recreational and general informational reading.

An Architecture Department Library, located in Daniels Hall, was established in 1941, and a Textile Department Library, located in the Textile Building, was established in 1945.

### YOUNG MEN'S CHRISTIAN ASSOCIATION

#### Board of Directors

M. E. GARDNER, *Chairman*

W. G. VAN NOTE, *Vice-Chairman*

E. L. Cloyd  
David A. Worth  
L. L. Vaughan  
John A. Park  
T. C. Brown  
J. M. Clarkson

F. B. Wheeler  
A. D. Stuart  
B. F. Brown  
Ralph W. Cummings  
W. N. Hicks  
Thomas Nelson

#### Employed Staff

EDWARD S. KING, General Secretary

MRS. L. W. BISHOP, Office Secretary

#### Student Organization

##### The Student Cabinet

The cabinet is composed of the four officers of the association, President, Vice-President, Secretary, and Treasurer and the chairmen of all standing committees. The officers are elected annually by ballot. The committee chairmen are appointed by the President. The cabinet is in charge of the program of the association. The President and Treasurer are ex-officio members of the Board of Directors.

The objective of the Young Men's Christian Association is to help contribute whatever is lacking in the total educational situation to make the principles and the spirit of the Christian religion effective in personal life and in all social relations.

The Y. M. C. A. Building is the social and religious center of the campus. On the basement floor are a recreation room, a guest room, and the Student Supply Store. There is a spacious lobby, an auditorium, a reception room, a dining room, the self-help office, and the service office on the first floor. The second floor provides space for the Faculty Club, a Conference Room, a committee room, the Y. M. C. A. Cabinet Room, and the office of the General Secretary.

The student-employment service is directed by the Assistant Secretary of the Association. Approximately five hundred and fifty students obtain part-time work through the Y. M. C. A. in the course of a year.

Student and faculty organizations of all kinds use the facilities of the building for meetings and social gatherings, entertainments and lectures.

The Y. M. C. A. program, directed by the Student Cabinet, includes, with other features not mentioned, work for new students; organizing a Freshman Cabinet; planning socials with the students from nearby women's colleges; bringing to the campus eminent men to speak on such topics as men-and-women relations, and present-day international, racial, and economic questions; conducting an annual religious-emphasis week under the leadership of Christian ministers or laymen who understand student life; sending delegates to State, regional, and National Christian Student Conferences.

### MILITARY TRAINING

#### **The Military Department: The Reserve Officers Training Corps**

The Reserve Officers Training Corps, the official designation of the military organization at State College, conducts the work in two courses of two years each:

**The Infantry Basic Course.**—A required course for all physically fit freshmen and sophomores.

**The Signal Corps Basic Course.**—A required course for all physically fit freshmen and sophomores in the School of Electrical Engineering.

**The Advanced Course.**—Elective and selective for juniors and seniors who have successfully completed the Basic Course in Infantry and/or the Signal Corps. Satisfactory completion of the Advanced Course and attendance of Officers Candidate School leads to a commission as a Second Lieutenant of Infantry or Signal Corps in the Officers Reserve Corps.

For detailed description of courses, see the courses listed under Military Science and Tactics.

**Drill.**—All ROTC students are required to attend three one-hour drill periods per week.

For the school year 1945-46 the only courses offered by the Military Department are Military 101, 102, 103, and Military 201, 202, 203.

### Uniforms and Equipment

**Army Officers.**—The Federal Government details officers of the Army as Instructors in the R. O. T. C. The senior instructor is designated by the War Department as Professor of Military Science and Tactics. Regular Army and/or Reserve officers conduct all classroom instruction and supervise the instruction of the corps on the drill fields.

**Uniforms.**—Uniforms for Basic Course students, and all instructional equipment are provided by the Federal Government. These are loaned to the Institution, which is accountable to the Federal Government for their proper care and use.

**Financial Aid.**—Members of the Advanced Course are paid a specific amount by the Federal Government. Each member is required to purchase necessary uniforms, textbooks, military shoes, and other pertinent items.

Payment for these items should be made in advance at the Treasurer's Office and credited to Military Stores. If credit is desired, a charge of 20% must be made to meet carrying charges and forfeitures of dealers' discounts.

The uniforms are made in the pattern of the Army Officers' uniform and can be used by the student for several years after he has received his commission in the Reserve Corps. In addition, the Advanced Course student receives from the Federal Government a daily pay amounting to approximately twenty-five cents per day. An Advanced Course student who withdraws from College prior to graduation must adjust his uniform account with the Military Department prior to departure from the Campus.

**Organization.**—The R.O.T.C. at State College is organized into the following units:

The First Infantry Regiment of three battalions, and First Battalion, Second Regiment, Signal Corps.

A Military Band, supervised by Military Staff and trained by the Director of Music of the College. Instruments are provided by the Federal Government. Membership is open to all student musicians who can qualify. Time is given for instruction in concert music in addition to military-band music.

A Military Drum-and-Bugle Corps is trained by cadet officers. Instruments are provided by the Military Department.

**Credit.**—Credit is allowed for work at other institutions having an R. O. T. C. Unit established in accordance with the provisions of the National Defense Act and Army Regulations. Record of a student's prior training in R. O. T. C. is obtained by the Military Department from the institution concerned.

**Educational Value.**—The mission of the R. O. T. C. is to qualify the student as a leader whether in peace or in war, to help prepare him to discharge his duties as a citizen and to awaken him to an appreciation of the obligations of citizenship. Primarily, it is an agency for the production of Reserve Officers for those arms which are restricted as to their sources of production, and it should produce for those arms the number of Reserve Officers required in the initial periods of general mobilization.

Students who complete the course, according to their own abundant testimony, secure personal benefits which are valuable to them in their occupations. They are better citizens because they have had inculcated an understanding of the responsibilities of citizenship. They realize more fully that the benefits their own generation enjoys were secured by sacrifices made by their predecessors. They learn the necessity for discipline, the responsibility of an individual to the group as a whole, and the methods by which discipline is developed and enforced. Finally, they learn the principles of leadership and have an opportunity to exercise this art to a greater extent than that which is available to them in any other phase of their scholastic instruction.

### III. SCHOOLS, DIVISIONS AND DEPARTMENTS THE BASIC DIVISION

Benjamin Franklin Brown, Dean

**Organization.**—Upon recommendation by President Graham, the Basic Division of the College was created by action of the Board of Trustees at its annual meeting on June 11, 1935. After considerable preliminary preparation, the organization of the Division became effective July 1, 1937, the first students being registered in the Division in September, 1938. For the first year it seemed advisable to include only the incoming freshmen. Beginning with the College year 1939-40, all freshmen and sophomores in the College are registered in the Basic Division.

Within its administration, the Basic Division includes the Departments of Economics, English, Ethics and Religion, History and Political Science, Modern Languages, Physical Education, and Sociology. The Heads of the Departments, or representatives from them, constituting the Administrative Board of the Division, together with the members of the several Departments are as follows:

#### Economics

Professor C. B. Shulenberger, Administrative Board Representative  
Professors B. F. Brown, R. O. Moen, †M. C. Leager; Associate Professors  
R. W. Green, T. W. Wood; Instructors \*\*L. J. Arrington,  
†R. L. McMillan

#### English

\*Professor Lodwick C. Hartley, Head of the Department  
Professor Roger P. Marshall, Acting Head of the Department  
Professors J. D. Clark, T. P. Harrison, A. I. Ladu; Associate Professors  
A. M. Fountain, E. H. Paget; Assistant Professors \*P. H. Davis, \*\*H. G.  
Kincheloe, \*\*F. H. Lyell, A. B. R. Shelley, T. L. Wilson, W. K. Wynn;  
Instructors J. C. Drake, \*\*A. N. Kruger, J. P. Nickell, \*\*J. A. Shackford,  
\*\*R. B. Wynne.

#### Ethics and Religion

Professor W. N. Hicks, Head of the Department

#### History and Political Science

Professor James W. Patton, Acting Head of the Department  
Associate Professor, L. W. Barnhardt  
Assistant Professors George Bauerlein, Jr., L. Walter Seegers

#### Modern Languages

Professor L. E. Hinkle, Head of the Department  
Associate Professor S. T. Ballenger; Instructors †I. O. Garodnick,  
Mrs. Ruth B. Hall

† On leave.

\* On leave with United States Navy.

\*\* On leave with United States Army.

### Physical Education and Athletics

Professor J. F. Miller, Head of the Department

Assistant Professors C. G. Doak, T. I. Hines

For names of Physical Education staff and athletic coaches see page 37.

### Sociology

Professor Sanford R. Winston, Head of the Department

### The Faculty of the Division

The faculty is composed of the staff members of the Departments named above and, in addition, the teachers of freshmen and sophomores from the Departments of Botany, Chemistry, Geology, Mathematics, Physics, Psychology, and Zoölogy.

**Purposes.**—Broadly speaking, the purposes of the Basic Division are (a) to provide the best possible preliminary training during the first two years of the student's college career so that he can during the last two years successfully pursue his professional education in agriculture and forestry, engineering, textiles, or vocational education; and (b) to provide effective guidance during the first two years, so that those students with well-chosen and fixed purposes can be well-advised in their educational careers, and also so that those students who have made an unsatisfactory choice of curriculum or who have become uncertain of their careers, may receive helpful guidance and advice in finding themselves.

More specifically it is the function of the Basic Division:

First, to provide "two years of basic courses in the humanities, natural and exact sciences, and the social sciences as the foundation of the schools of agriculture and forestry, textiles, and engineering;"<sup>1</sup>

Second, "to provide in the curricula of the upper years of each technological school for a minimum of the more general cultural courses in the humanities, natural sciences, and social sciences."<sup>2</sup>

**Student Guidance.**—In carrying out its guidance program, the Basic Division avails itself of numerous tests which indicate the past achievements and the present rate of progress of its students. Upon entering, all freshmen take the placement tests in Mathematics and in English, and the psychological examination. In addition to these, the advisers have the use of mid-term reports on all students, the final examination record, the dormitory reports, and the record from the Dean of Students.

Each student is assigned to a technical adviser in the curriculum in which he is registered, to assist him in planning for his professional career. Students whose records indicate that they are not qualified for the curriculum they have chosen, or who become dissatisfied with their course, are assigned to guidance counselors for special assistance.

<sup>1</sup> President Graham's Report to the Board of Trustees, June 11, 1935, page 11.

<sup>2</sup> Ibid.

† On leave.

**Promotion.**—A student is promoted from the Basic Division upon earning with an average grade of at least C not fewer than 105 credits, including all of the work prescribed in his freshman year.

Those promoted may procure Certificates of Promotion upon application to the Dean of the Basic Division.

**Student Loads.**—It is the policy of the Basic Division and the purpose of its scholarship rules to encourage students to take such a number of credit hours each term as they can carry well, depending upon previous preparation, ability, self-help duties, health, etc. With few exceptions, each student starts the first term of his first year with a normal average load; those who do exceptionally well are encouraged to make as good progress as possible by adding hours up to their capacity, while those whose records indicate lack of ability from any cause are urged to reduce their loads to a point where they can do work of a creditable quality. Judgment as to the load that a student should take in any term is based upon previous demonstration of scholarship.

Special Testing Service is provided by the Department of Psychology in order to assist advisers and counselors in the guidance of students. In addition to the tests given to all freshmen already referred to, provisions are made for testing individual students who present special problems for study. The "testing service" rendered by the staff in Psychology administers tests for aptitudes, personality, interests, and educational achievement. Efforts are being made to provide a clinical approach to a study of the educational, vocational, and personality problems of individual students.

### PROGRAMS OF STUDY

**Programs of Study.**—The Basic Division grants no degrees. It provides two years of fundamental training in preparation for the special training of the last two years in the other divisions of the College:

- The School of Agriculture and Forestry
- The School of Engineering
- The Division of Teacher Education
- The School of Textiles

Its programs of study are as follows:

## AGRICULTURE AND FORESTRY

## Majors in:

Animal Production	Farm Marketing and	Pomology
Dairy Manufacturing	Farm Finance	Poultry Science
Entomology	Field Crops	Rural Sociology
Farm Business	Floriculture	Soils
Administration	Plant Pathology	Vegetable Gardening

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103 . . . . .	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
Algebra and Trigonometry, Math. 111, 112 . . . . .	0	4	4
Economic History, Hist. 101, 102, 103 . . . . .	3	3	3
Gen. Zoology, Gen. Botany, Phys. Geology, Zool. 101, Bot. 102, Geol. 120 . . . . .	4	4	4
†Military Science I, Mil. 101, 102, 103 . . . . .	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103 . . . . .	1	1	1
Gen. Poultry, Anim. Nutrition, Gen. Horticulture, Poul. 201, A. H. 202, Hort. 203 . . . . .	3	3	3
Prin. of Forestry, Farm Equipment, Gen. Field Crops, For. 111, Agr. Eng. 202, F. C. 202 . . . . .	3	3	3
Gen. Botany, Econ. Zoology, Soils, Bot. 101, Zool. 102, Soils 201 . . . . .	4	4	5
Physics for Ag. Students, Int. to Org. Chemistry, Animal or Plant Physiology, Phys. 115, Chem. 221, Zool. 202 or Bot. 221 . . . . .	5	4	5
General and Agr. Economics, Econ. 201, 202, Agr. Econ. 202 . . . . .	3	3	3
†Military Science II, Mil. 201, 202, 203 . . . . .	2	2	2
Sport Activities, P. E. 201, 202, 203 . . . . .	1	1	1

## Major in Agricultural Chemistry

Composition, Eng. 101, 102, 103 . . . . .	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
Algebra and Trigonometry, Math. 111, 112 . . . . .	0	4	4
Economic History, Hist. 101, 102, 103 . . . . .	3	3	3
Gen. Zoology, Gen. Botany, Phys. Geology, Zool. 101, Bot. 102, Geol. 120 . . . . .	4	4	4
†Military Science I, Mil. 101, 102, 103 . . . . .	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103 . . . . .	1	1	1
Qualitative and Quantitative Analysis, Chem. 211, 212, 233 . . . . .	4	4	4
Gen. Botany, Econ. Zoology, Animal or Plant Physiology, Bot. 101, Zool. 102, Zool. 202, or Bot. 221 . . . . .	4	4	5
Soils, Bacteriology, Anim. Nutrition, Soils 201, Bot. 402, A. H. 202 . . . . .	5	4	3
General and Agr. Economics, Econ. 201, 202, Agr. Econ. 202 . . . . .	3	3	3
†Military Science II, Mil. 201, 202, 203 . . . . .	2	2	2
Sport Activities, P. E. 201, 202, 203 . . . . .	1	1	1

† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

## Major in Agricultural Engineering

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	3	3	3
+Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
Surveying, C. E. s200, 3 credits			Summer
Business English, Public Speaking, Eng. 211, 281	3	0	3
Farm Equipment, Agr. Eng. 202	0	3	0
Calculus I, II, III, Math. 201, 202, 303	4	4	4
Economic History, Hist. 101, 102, 103	3	3	3
Physics for Engineers, Phys. 201, 202, 203	4	4	4
Gen. Zoology, Gen. Botany, Eng. Geology, Zool. 101, Bot. 102, Geol. 220	4	4	3
+Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

## Major in Forestry

Composition, Eng. 101, 102, 103	3	3	3
Algebra, Trigonometry, and Math. of Finance, Math. 111, 112, 113	4	4	4
Drawing, C. E. 101, 102, 103	1	1	1
General Botany, Systematic Botany, Bot. 101, 102, 203	4	4	3
General and Economic Zoology, Econ. Entomology, Zool. 101, 102, 213	4	4	4
Elementary Forestry, For. 101, 102, 103	1	1	1
+Military Science I, Mil. 101, 102, 103 or Human Rel. Soc. 101, 2, 3	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Introduction to Economics, Land Economics, Econ. 205, Agr. Econ. 212	3	3	0
Introduction to Psychology, Psychol. 200	0	0	3
Plant Physiology, Physical Geology, Bot. 221, Geol. 120	5	4	0
Dendrology, Wood Technology, Bot. 211, For. 202, Bot. 213	3	3	3
Theoretical Surveying, C. E. 221, 222	0	3	3
Field Surveying, Topographical Drawing, C. E. 225, 224	0	1	1
Intro. Soc., Soc. 202	0	0	3
+Military Science II, Mil. 201, 202, 203, or World Hist. Hist. 104	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1
Surveying and Mapping, Dendrology, Mensuration, Silviculture, C. E. s300, For. s214, s304, s204			Summer

\* Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

## THE BASIC DIVISION

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### Major in Landscape Architecture

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103	3	3	3
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	6	6	6
General Botany, Systematic Botany, Bot. 101, 102, 203	4	4	3
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	3	3	3
Arboriculture, L. A. 101, 102, 103	1	1	1
Drawing, C. E. 101, 102, 103	1	1	1
†Military Science I, Mil. 101, 102, 103 or Human Rel., Soc. 101, 2, 3	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
 Business English, Public Speaking, Eng. 211, 231	3	0	3
Physical Geology, Plant Physiology, Geol. 120, Bot. 221	0	4	5
Introduction to Psychology, Introduction to Economics, Psych. 200, Econ. 205	3	3	0
Introduction to Architecture, Elements of Architecture, Arch. 201, 202, 203	3	3	3
Pencil Sketching, Arch. 100	3	0	0
Theory of Landscape Design, L. A. 212, 213	0	3	3
Theoretical Surveying, C. E. 221, 222	3	3	0
Field Surveying, C. E. 225, 227	1	0	1
Plant Materials: Woody Plants, L. A. 201, 202, 203	2	2	2
†Military Science II, Mil. 201, 202, 203, or World Hist., Hist. 104	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1
Surveying, C. E. s310, 3 credits			Summer

### Major in Wildlife Conservation and Management

Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Algebra and Trigonometry, Math. 111, 112	0	4	4
Economic History, Hist. 101, 102, 103	3	3	3
General and Economic Zoology, Phys. Geology, Zool. 101, 102, Geol. 120	4	4	4
Elementary Wildlife Management, Zool. 111	1	0	0
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
 Public Speaking, Eng. 231	3	0	0
Ornithology, Zool. 251, 252, 253	2	2	2
General Botany, Systematic Botany, Bot. 101, 102, 203	4	4	3
Principles of Forestry, General Field Crops, Introduction to Organic Chemistry, For. 111, F. C. 202, Chem. 221	3	3	4
Introduction to Economics, Land Economics, Econ. 205, Agr. Econ. 212	3	3	0
Physics for Agricultural Students, Phys. 115	0	0	5
Theoretical Surveying, C. E. 221, 222	3	3	0
Field Surveying, C. E. 225	1	0	0
Comparative Anatomy, Zool. 222, 223	0	4	4
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

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† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

## ENGINEERING

## Major in Aeronautical Engineering

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	5	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	3	3	3
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
Surveying, C. E. s200, 3 credits			
	Summer		
*Business English, Public Speaking, Eng. 211, 231, and elective English	3	3	3
Calculus I, II, III, Math. 201, 202, 308	4	4	4
Physics for Engineers, Phys. 201, 202, 203	4	4	4
Mechanical Drawing, M. E. 211, 212, 213	2	2	2
Shopwork, M. E. 121, 122, 123	1	1	1
Metallurgy, Engineering Mechanics, M. E. 322, 323, E. M. 311	3	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

## Major in Architectural Engineering

Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	3	3	3
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
Surveying, C. E. s200, 3 credits			
	Summer		
*Business English, Public Speaking, Eng. 211, 231, and elective English	3	3	3
Calculus I, II, III, Math. 201, 202, 308	4	4	4
Physics for Engineers, Phys. 201, 202, 203	4	4	4
Pencil Sketching, Arch. 100	1	1	1
Elements of Architecture I, II, III, Arch. 201, 202, 203	3	3	3
Shades and Shadows, Arch. 205	2	0	0
Perspective Drawing, Arch. 206	1	0	0
Engineering Mechanics, E. M. 311, 312	0	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

\* Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

## Major in Architecture

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103	3	3	3
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	6	6	6
French or Modern Language, M. L. 101, 102, 201 or equivalent	3	3	3
Pencil Sketching, Arch. 100	1	1	1
World History, Hist. 104	2	2	2
Architectural or Mechanical Drawing, Arch. 107 or M. E. 105, 106	3	3	0
Descriptive Geometry, M. E. 107	0	0	3
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
Surveying, C. E. s200, 3 credits	Summer		
Calculus I, II, III, Math. 201, 202, 303	4	4	4
Background for Modern Thought or Elective	3	3	3
Physics for Engineers, Phys. 201, 202	4	4	0
History of Sculpture, Arch. 325	0	0	2
Working Drawings, Arch. 305	0	0	0
Shades and Shadows, Arch. 205	2	0	0
Perspective Drawing, Arch. 206	1	0	0
Engineering Mechanics, E. M. 301, 302	0	3	3
Elements of Architecture, Arch. 201, 202, 203	3	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

## Major in Ceramic Engineering

Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	3	3	3
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
Surveying, C. E. s200, 3 credits	Summer		
*Business English, Public Speaking, Eng. 211, 231, and elective English Qualitative and Quantitative Analysis, Mineralogy, Chem. 211, 212, Geol. 230	3	3	3
Calculus I, II, III, Math. 201, 202, 303	4	4	4
Physics for Engineers, Phys. 201, 202, 203	4	4	4
Engineering Geology, Ceramic Materials, Ceramic and Mining Processes, Geol. 220, Cer. E. 202, 203	3	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

\* Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

## Major in Chemical Engineering

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103 . . . . .	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103 . . . . .	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107 . . . . .	3	3	3
†Military Science I, Mil. 101, 102, 103 . . . . .	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103 . . . . .	1	1	1
*Business English, Public Speaking, Eng. 211, 231, and elective English . . . . .	3	3	3
Qualitative and Quantitative Analysis, Chem. 211, 212, 213 . . . . .	4	4	4
Calculus I, II, III, Math. 201, 202, 303 . . . . .	4	4	4
Physics for Engineers, Phys. 201, 202, 203 . . . . .	4	4	4
Introduction to Chemical Engineering, Chem. E. 201, 202, 203 . . . . .	1	1	2
Shopwork, M. E. 122, 123 . . . . .	1	1	0
†Military Science II, Mil. 201, 202, 203 . . . . .	2	2	2
Sport Activities, P. E. 201, 202, 203 . . . . .	1	1	1

## Major in Civil Engineering

Composition, Eng. 101, 102, 103 . . . . .	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103 . . . . .	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107 . . . . .	3	3	3
†Military Science I, Mil. 101, 102, 103 . . . . .	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103 . . . . .	1	1	1
**Business English, Public Speaking, Eng. 211, 231, and elective English . . . . .	3	3	3
Calculus I, II, III, Math. 201, 202, 303 . . . . .	4	4	4
Physics for Engineers, Phys. 201, 202, 203 . . . . .	4	4	4
Engineering Geology, Engineering Mechanics, Geol. 220, E. M. 311, 312 . . . . .	3	3	3
Theoretical Surveying, C. E. 221, 222, 223 . . . . .	3	3	3
Field Surveying, C. E. 225, 227 . . . . .	1	0	1
Mapping, C. E. 226 . . . . .	0	1	0
†Military Science II, Mil. 201, 202, 203 . . . . .	2	2	2
Sport Activities, P. E. 201, 202, 203 . . . . .	1	1	1
Surveying, C. E. s310, 3 credits . . . . .			Summer

\* Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

\* Students who have been certified by the Department of English as proficient in English may substitute for the courses listed Elementary German, M. L. 103, 104, 203 or equivalent.

\*\* Students who have been certified by the Department of English as proficient in English may substitute for the courses listed Elementary French, M. L. 101, 102, 201 or equivalent.

## Major in Electrical Engineering

Courses		F	W	S
Composition, Eng. 101, 102, 103	.....	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	.....	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	.....	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	.....	3	3	3
†Military Science I, Mil. 101, 102, 103	.....	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	.....	1	1	1
Surveying, C. E. s200, 3 credits	.....			
	Summer			
*Business English, Public Speaking, Eng. 211, 231, and elective English	.....	3	3	3
Calculus I, II, III, Math. 201, 202, 303	.....	4	4	4
Physics for Engineers, Phys. 201, 202, 203	.....	4	4	4
General Economics, Econ. 201, 202, 203	.....	3	3	3
Electrical Engineering Fundamentals, Forge and Welding, E. E. 201, 202, M. E. 128	.....	3	3	3
†Military Science II, Mil. 201, 202, 203	.....	2	2	2
Sport Activities, P. E. 201, 202, 203	.....	1	1	1

## Major in General Engineering

Composition, Eng. 101, 102, 103	.....	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	.....	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	.....	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	.....	3	3	3
†Military Science I, Mil. 101, 102, 103	.....	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	.....	1	1	1
Surveying, C. E. s200, 3 credits	.....			
	Summer			
*Business English, Public Speaking, Eng. 211, 231, and elective English	.....	3	3	3
Calculus I, II, III, Math. 201, 202, 303	.....	4	4	4
Physics for Engineers, Phys. 201, 202, 203	.....	4	4	4
†Electives	.....	6	6	6
†Military Science II, Mil. 201, 202, 203	.....	2	2	2
Sport Activities, P. E. 201, 202, 203	.....	1	1	1

† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

\* Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

† Free electives, except that not more than 39 term credits may be chosen from the technical or special technical courses in the School of Engineering.

## Major in Geological Engineering

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	3	3	3
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
 *Business English, Public Speaking, Eng. 211, 231, and elective English			
Qualitative and Quantitative Analysis, Geomorphology, Chem. 211, 212, Geol. 223	3	3	3
Calculus I, II, III, Math. 201, 202, 303	4	4	4
Physics for Engineers, Phys. 201, 202, 203	4	4	4
Engineering and Historical Geology, Mineralogy, Geol. 220, 222, 230	3	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

## Major in Industrial Engineering

Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	3	3	3
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
 **Business English, Public Speaking, Eng. 211, 231, and elective English			
Calculus I, II, III, Math. 201, 202, 303	4	4	4
Physics for Engineers, Phys. 201, 202, 203	4	4	4
General Economics, Econ. 201, 202, 203	3	3	3
Shopwork, M. E. 124, 125, 126	2	2	2
Industrial Organization, I. E. 101, 102, 103	3	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

\* Students who have been certified by the Department of English as proficient in English may substitute for the courses listed Elementary French, M. L. 101, 102, 201.

\*\* Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

## Major in Mechanical Engineering

Courses		F	W	S
Composition, Eng. 101, 102, 103	.....	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	.....	4	4	4
Algebra, Trigonometry, Analytics, Math. 101, 102, 103	.....	6	6	6
Engineering Drawing II, Descriptive Geometry, M. E. 105, 106, 107	.....	3	3	3
†Military Science I, Mil. 101, 102, 103	.....	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	.....	1	1	1
Surveying, C. E. s200, 3 credits	.....			
	Summer			
*Business English, Public Speaking, Eng. 211, 231, and elective English	.....	3	3	3
Calculus I, II, III, Math. 201, 202, 303	.....	4	4	4
Physics for Engineers, Phys. 201, 202, 203	.....	4	4	4
Mechanical Drawing, M. E. 211, 212, 213	.....	2	2	2
Shopwork, M. E. 124, 125, 126	.....	2	2	2
Engineering Mechanics, E. M. 311, 312	.....	0	3	3
†Military Science II, Mil. 201, 202, 203	.....	2	2	2
Sport Activities, P. E. 201, 202, 203	.....	1	1	1

## TEACHER EDUCATION

## For Teachers of Agriculture

Composition, Eng. 101, 102, 103	.....	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	.....	4	4	4
Algebra and Trigonometry, Math. 111, 112	.....	0	4	4
Economic History, Hist. 101, 102, 103	.....	3	3	3
Gen. Zoology, Gen. Botany, Phys. Geology, Zool. 101, Bot. 102, Geol. 120	.....	4	4	4
†Military Science I, Mil. 101, 102, 103	.....	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	.....	1	1	1
Gen. Poultry, Anim. Nutrition, Gen. Horticulture, Poult. 201, A. H. 202, Hort. 203	.....	3	3	3
Prin. of Forestry, Farm Equipment, Gen. Field Crops, For. 111, Agr. Eng. 202, F. C. 202	.....	3	3	3
Gen. Botany, Econ. Zoology, Soils, Bot. 101, Zool. 102, Soils 201	.....	4	4	5
Physics for Ag. Students, Int. to Org. Chemistry, Animal or Plant Physiology, Phys. 115, Chem. 221, Zool. 202 or Bot. 221	.....	5	4	5
General and Agr. Economics, Econ. 201, 202, Agr. Econ. 202	.....	3	3	3
†Military Science II, Mil. 201, 202, 203	.....	2	2	2
Sport Activities, P. E. 201, 202, 203	.....	1	1	1

† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

\* Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

## For Teachers of Industrial Arts and Teachers of Industrial Education

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Algebra, Trigonometry, Mathematics of Finance, Math. 111, 112, 113	4	4	4
Industrial Arts Drawing, Ed. (I. A.) 105a, b, c	3	3	3
Industrial Arts, Ed. (I. A.) 106a, b, c	3	3	3
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
Business English, Public Speaking, English Elective, Eng. 211, 231	3	3	3
General Physics, Phys. 105, 106, 107	4	4	4
Economic History, Hist. 101, 102, 103	3	3	3
General Sociology, Soc. 202, 203	3	3	0
Industrial Arts Design, Ed. (I. A.) 205	0	0	3
Laboratory Problems in Industrial Arts, Ed. (I. A.) 206a, b, c	3	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

## For Teachers of Occupational Information and Guidance

Composition, Eng. 101, 102, 103	3	3	3
Algebra, Trigonometry, Mathematics of Finance, Math. 111, 1112, 113	4	4	4
Science, elective	4	4	4
Economic History, Hist. 101, 102, 103	3	3	3
General Sociology, Soc. 202, 203	3	3	0
Occupations, Ed. 103	0	0	3
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
Business English, Public Speaking, English Elective, Eng. 211, 231	3	3	3
General Economics, Econ. 201, 202, 203	3	3	3
History of the United States, Hist. 200, 201, 202	3	3	3
Science elective	4	4	4
*Electives	3	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, Social Science.

## TEXTILES

**Majors in Textile Manufacturing, Textile Chemistry and Dyeing, Yarn Manufacturing, Textile Management, Weaving and Designing.**

Courses	Terms and Credits		
	F	W	S
Composition, Eng. 101, 102, 103	3	3	3
Algebra, Trigonometry, Mathematics of Finance, Math. 111, 112, 113	4	4	4
Physics for Textile Students, Phys. 111, 112, 113	4	4	4
Shopwork, M. E. 121, 122, 123	1	1	1
Engineering Drawing I, M. E. 101, 102, 103	2	2	2
Textile Principles Laboratory, Tex. 101, 102, 103	0	1	1
Yarn Calculations, Cloth Calculations, Tex. 104, 131	1	1	2
†Military Science I, Mil. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103	1	1	1
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Economic History, Hist. 101, 102, 103	3	3	3
Cotton, Cotton Classing II, F. C. 201, 212	3	3	0
Decorative Drawing, Light in Industry, Arch. 106, Phys. 311	3	0	3
Knitting Laboratory, Tex. 207, 208, 209	1	1	1
Knitting I, Fabric Structure and Analysis, Tex. 211, 236, 237	2	2	0
Power Weaving, Tex. 234	0	2	0
Power Weaving Laboratory, Tex. 231, 232	1	1	0
Yarn Manufacturing, Tex. 205	0	0	3
Yarn Manufacturing Laboratory, Tex. 201, 203	1	0	1
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1

† Or six credits in one or two of the following departments: Economics, Ethics and Religion, History and Political Science, Modern Languages, Psychology, Sociology.

**THE SCHOOL OF AGRICULTURE AND FORESTRY**

Ira Obed Schaub, Dean and Director of Extension

Leonard David Baver, Associate Dean and Director of Instruction and  
Director of the Agricultural Experiment Station

**Organization.**—The School of Agriculture and Forestry is organized in three divisions—Resident Instruction, Agricultural Extension and the Agricultural Experiment Station—to carry on the functions of instruction, extension and research. These divisions are organized as departments as follows: (a) Agricultural Economics, including Farm Marketing and Farm Management; (b) Agricultural Engineering, including Farm Structures and Farm Machinery; (c) Agronomy, including Field Crops, Soils, and Plant Breeding ;(d) Animal Industry, including Animal Production, Animal Nutrition, Dairy Production, and Dairy Manufacturing; (e) Botany, including Bacteriology, Plant Physiology, and Plant Diseases; (f) Chemistry; (g) Experimental-Statistics; (h) Forestry, including Silviculture, Utilization, and Management; (i) Horticulture, including Pomology, Small-Fruit Culture, Floriculture, Truck Farming, and Landscape Architecture; (j) Poultry Science, including Poultry Diseases, Poultry Breeding, Poultry Feeding, and Poultry Management; (k) Rural Sociology; (l) Zoölogy, including Genetics, Entomology, Animal Physiology, and Wild Life Management.

**Purpose.**—The purpose of the School of Agriculture and Forestry is threefold: (1) To obtain through scientific research, experimentation, and demonstration accurate and reliable information relating to soils, plants, and animals, and to obtain from every available source reliable statistical, technical, and scientific data relating to every phase of agriculture that might be of advantage to the State; (2) to provide instruction in the College for young men who desire to enter the field of general agriculture, or wish to become professionals in agricultural education or specialists in any field of science related to agriculture; (3) to disseminate reliable information through publications and through extension agents, and by a wise use of this information to give instruction to agricultural workers in the scientific, experimental, and practical progress in the various lines of agriculture.

All effective instruction in agriculture is based on research and investigation; and the curricula are so organized that not only the subject matter for classroom instruction and extension work may be drawn from research, experimentation, and demonstration, but also that the students themselves shall have the opportunity to work under the direction of research specialists.

The vocations open to young men well trained in agriculture and the opportunities afforded for distinct service to the State are now greater than ever before. In order that the more important vocations in agriculture may be presented to the youth of the State, the courses of study are so organized as to give specific training for the following major vocations.

General Farming	Poultry Raising
Agricultural Extension Work	Manufacturing of Dairy Products
Agricultural Service in State or Federal Departments	Forestry
Stock Raising and Dairying	Fruit Growing
	Truck Farming
	Agricultural Service in Foreign Lands

In addition to these major vocations, the School of Agriculture gives instruction in Beekeeping, Floriculture, and the basic instruction for teachers of Agriculture.

**Admission; Advanced Standing.**—Regulations for admission and for advanced standing are stated under Information for Applicants. (See pages 25, 26.)

**Graduates in Liberal Arts.**—Selected courses leading to the degree of Bachelor of Science in Agriculture are offered to graduates of universities and standard colleges. These are arranged in accordance with the vocational aim of the individual student, and in the light of credits presented from the institution by which the student has been graduated, subject to the approval of his adviser and the Director of Instruction. In cases where the student presents enough credits which may be used for courses required in his curriculum, he may be graduated with a B.S. degree in one year. In no case should it take more than two years to complete the work for this degree.

**Graduation.**—The requirement for graduation is the satisfactory completion of one of the curricula outlined below.

A minimum of 230 term credits with at least 230 honor points is required for graduation by the School of Agriculture. The term credits should be distributed as follows: A maximum of 60 in the major Department, and a minimum of 18 in Language, 24 in Physical Science, 18 in Social Science, 12 in Military Science or alternative, and 6 in Physical Education.

Students entering with advanced standing are required, in the remainder of their course, to earn at least as many points as the number of term credits remaining necessary for graduation.

**Degrees.**—The degrees of Bachelor of Science in Agriculture and Bachelor of Science in Forestry are conferred upon the satisfactory completion of one of the curricula in this School.

The degree of Master of Science in Agriculture is offered for the satisfactory completion of one year of graduate study in residence. Candidates for this degree are enrolled as students in the Graduate School.

The professional degree of Master of Agriculture may be conferred upon graduates of State College after five years of service in agriculture, and upon the acceptance of a satisfactory thesis.

**Curricula.**—The curricula in Agriculture offer a combination of practical and theoretical work. About half of the time is devoted to lectures and recitations, the other half to work in shops, laboratories, greenhouses, dairies, poultry yards, and on the College farm.

In order that every graduate of the School of Agriculture shall acquire a liberal education rather than specializing too narrowly, and shall become a leader having breadth of vision, the curricula in Agriculture contain broadening subjects: language, literature, history, and the social sciences.

The School of Agriculture and Forestry offers the following curricula:

A. In General Agriculture with opportunities to specialize during junior and senior years in any of the following:

- |                                    |                            |
|------------------------------------|----------------------------|
| 1. Farm Business Administration    | 8. Floriculture            |
| 2. Farm Marketing and Farm Finance | 9. Plant Pathology         |
| 3. Rural Sociology                 | 10. Pomology               |
| 4. Animal Production               | 11. Poultry Science        |
| 5. Dairy Manufacturing             | 12. Soils                  |
| 6. Entomology                      | 13. Vegetable Gardening    |
| 7. Field Crops and Plant Breeding  | 14. Agricultural Chemistry |
- B. In Agricultural Engineering  
C. In Forestry  
D. In Landscape Architecture  
E. In Wildlife Management

### GENERAL AGRICULTURE

**First Two Years.**—The freshman and sophomore years for all courses are outlined on a following page. This curriculum is intended to train students in broad basic fields of agriculture. For junior and senior years, the curriculum of each student is arranged in accordance with his vocational aims, subject to the approval of his adviser and the Director of Instruction.

**Professional Opportunities.**—Students who specialize in some department of the School of Agriculture may look forward to one of the following professions:

**Specialists in State or Federal Departments, or in Agriculture Colleges.**—The School of Agriculture is equipped to train men as specialists in the various fields as indicated by the curricula outlined below.

**Inspectors.**—Most States now maintain inspection of fertilizers, seeds, nurseries, and insecticides. Most cities have special inspectors for their milk supplies. Students seeking vocational opportunities in these fields may elect appropriate subjects in their junior and senior years.

**Extension Specialists.**—Students in this group will find employment as agricultural agents for railroads, and for commercial firms dealing in agricultural products; as specialists in the various fields of agriculture in the extension departments of agricultural colleges, and as county agricultural agents.

**County Agents.**—The growing importance of marketing agricultural products and the need for better organization of farms has given rise to a strong demand for county agents who have had special training in Agricultural Economics.

**Specialists and Commercial Agricultural Agents.**—The School of Agriculture is well equipped to train men for agricultural industries, such as manufacturing fertilizers, livestock and poultry feeds, farm machinery, and dairy and horticultural products. These concerns are usually anxious to obtain men who have had actual agricultural experience, and who, in addition, have had special training in agricultural economics, accounting, and statistics. This field is developing rapidly and offers an attractive opportunity for students who wish to enter the purely commercial field.

**Agricultural Specialists in Foreign Lands.**—The School of Agriculture is well equipped to train men as experts in cotton and tobacco production in foreign lands.

**Junior Agriculture Economist.**—A position as a junior agricultural economist involves research in Agricultural Economics. Such positions are usually available in the governmental departments, such as United States Department of Agriculture and in various State institutions.

**Farm Manager.**—There is a growing demand for men who have had practical farm experience and who have special training in farm organization and management. Though this field is practically a new one, there have been many requests for men with special training in farm management.

**Marketing Specialists.**—There is a growing demand for men who can manage coöperative marketing and other farmers' business associations.

### FOR ALL CURRICULA IN AGRICULTURE

(Except Agricultural Chemistry, Agricultural Engineering, Forestry, Landscape Architecture, and Wildlife Conservation and Management.)

#### Freshman Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Composition, Eng. 101, 102, 103 . . . . .	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
General Botany, Bot. 102 . . . . .	0	4	0
General Zoology, Zool. 101 . . . . .	4	0	0
Physical Geology, Geol. 120 . . . . .	0	0	4
Economic History, Hist. 101, 102, 103 . . . . .	3	3	3
Mathematical Analysis, Math. 111, 112 . . . . .	0	4	4
Military Science I, Mil. 101, 2, 3, or alternate . . . . .	2	2	2
Fundamental Activities and Hygiene, P. E. 101, 102, 103 . . . . .	1	1	1
	—	—	—
	17	21	21

## Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Farm Equipment, Agr. Eng. 202	0	3	0
Soils, Soils 201	5	0	0
General Economics, Econ. 201, 202	3	3	0
Agricultural Economics, Agr. Econ. 202	0	0	3
Physics for Agricultural Students, Phys. 115	0	5	0
Animal Physiology, Zool. 202, or Plant Physiology, Bot. 221	0	0	5
Economic Zoology, Zool. 102	0	4	0
General Botany, Bot. 101	0	0	4
Introduction to Organic Chemistry, Chem. 221	0	4	0
Animal Nutrition I, A. H. 202	0	3	0
General Poultry, Pou. 201	3	0	0
Principles of Forestry, For. 111	3	0	0
General Horticulture, Hort. 203	0	0	3
General Field Crops, F. C. 202	0	0	3
Military Science II, Mil. 201, 2, 3, or alternate	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1
	—	—	—
	21	21	21

## AGRICULTURAL ECONOMICS

Professor G. W. Forster, Head of the Department

Professors C. Horace Hamilton, Marc C. Leager;\* Associate Professor R. E. L. Greene; Assistant Professor B. W. Kenyon, Jr.; Instructor, Richard L. Anderson.\*

**Facilities.**—The Department of Agricultural Economics has available for its use 15 offices, a seminar room, a document room, a workshop, and a Departmental classroom. The Department is supplied with various calculating devices. In addition, by special arrangement of one of the large calculating-machine companies, a supply of calculators and tabulating devices is adjusted to the need for them. Charts on practically every phase of agricultural economics are at hand or are available through the courtesy of the U. S. Department of Agriculture. A large number of maps of farms located in various parts of the state is used as a basis for studying and for illustrating the principles and practices of farm management. The results of research in marketing, agricultural finance, taxation, insurance, and soil conservation practices have made a large volume of statistical information constantly available for undergraduate and graduate students. Maintained for reference is an up-to-date file of bulletins and documents covering all phases of agricultural economics.

**The State a Laboratory.**—The State of North Carolina is a laboratory for the Department. Studies are in progress on all important phases of agricultural economics: marketing of cotton, tobacco, fruits, and vegetables; farm credit, taxation of agriculture, farm prices, farm organization and management, land classification and land use. It is significant to the student in agricultural economics that much of the research is done in coöperation with the various agencies of the Federal Government.

**Statistical Laboratory.**—All students in the department will have access to the facilities and personnel of the new Statistical Laboratory established at State College in coöperation with the U. S. Department of Agriculture, through formal courses and informal conferences.

\* On leave.

## CURRICULA IN AGRICULTURAL ECONOMICS

## Farm Business Administration

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

COURSES	First Term	Second Term	CREDITS Third Term
English .....	3	3	3
Farm Management I, Agr. Econ. 303 .....	0	0	3
Principles of Accounting, Econ. 301, 302, 303 .....	3	3	3
Farm Shop Work, Agr. Eng. 331, 32 .....	3	3	0
Economics .....	3	3	3
Technical Agricultural Courses .....	3	3	3
**Electives .....	3	3	3
	18	18	18

## Senior Year

Agricultural Finance, Agr. Econ. 432 .....	0	3	0
Farm Management II, Agr. Econ. 423 .....	0	0	3
Farm Buildings, Agr. Eng. 322 .....	0	3	0
Farm Cost Accounting, Agr. Econ. 402, 403 .....	0	3	3
Agr. Marketing, Agr. Econ. 411 .....	3	0	0
Terracing and Drainage, Agr. Eng. 303 .....	0	0	3
Social Aspects of Land Tenure, Rur. Soc. 422 or Land Economics, Agr. Econ. 412 .....	0	3	0
Agr. Drawing, Agr. Eng. 222 .....	0	3	0
Survey of Statistical Methods, Econ. 408 .....	3	0	0
Statistics .....	0	3	0
Technical Agricultural Courses .....	6	0	3
Electives .....	3	0	3
**Electives .....	3	3	3
	18	21	18

## Farm Marketing and Farm Finance

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

English .....	3	3	3
Marketing Methods, Econ. 311, 312 .....	3	3	0
Rural Sociology, Rur. Soc. 302 .....	0	3	0
Farm Management I, Agr. Econ. 303 .....	0	0	3
Agr. Marketing, Agr. Econ. 411 .....	3	0	0
Principles of Accounting, Econ. 301, 302, 303 .....	3	3	3
Economics .....	3	3	3
Electives .....	0	0	4
**Electives .....	3	3	3
	18	18	19

## Senior Year

Marketing Methods and Problems, Agr. Econ. 421 .....	3	0	0
Cotton and Tobacco Marketing, Agr. Econ. 442 .....	0	3	0
Agricultural Finance, Agr. Econ. 432 .....	0	3	0
Agricultural Cooperation, Agr. Econ. 422 .....	0	0	0
Rural Population Problems, Rur. Soc. 411 .....	3	0	0
Community Organization, Rur. Soc. 413 .....	0	0	3
Survey of Statistical Methods, Econ. 408 .....	3	0	0
Statistics .....	0	3	0
Economics .....	3	3	3
Technical Agricultural Courses .....	3	0	6
Electives .....	0	0	3
**Electives .....	3	3	3
	18	18	18

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

**AGRICULTURAL ENGINEERING**

Professor D. S. Weaver, Head of the Department

Associate Professor G. W. Giles

**Purpose.**—This curriculum has been arranged to give its graduates fundamental training in engineering, basic training in the agricultural sciences, and a specialized study in courses involving the application of engineering knowledge to agricultural problems.

**Breadth of Training.**—Because of the great variety of work required of agricultural engineers, a number of subjects peculiar to other curricula are included, so that the student receives a considerable breadth of training. Engineering principles applied to agriculture have played an important part in the advancement and development of agricultural practices. Agricultural engineering as a profession, although of comparatively recent development, is rapidly becoming recognized as one of the more important of the engineering professions, since it is identified with the most important of industries—agriculture. This course is especially suited to the boy brought up on the farm, as it prepares him for professional business, or farming career, and enables him to capitalize on his farm experience.

**Divisions.**—Subdivided on the basis of engineering technique, Agricultural Engineering embraces three general fields: (1) Power and Machinery, including Rural Electrification; (2) Rural Structures, including Sanitation, Materials of Construction and Equipment; (3) Land Improvement, which includes Irrigation, Drainage, Soil-Erosion Control, and other forms of mechanical improvement of agricultural lands.

**Occupations Open to Graduates.**—Teaching, experiment station and extension-service positions with colleges and the Government; engineers in land reclamation, drainage, or irrigation enterprises; designing, advertising, sales and production work with manufacturers of farm machinery, equipment, and building materials; rural electrification work; editorial work with publishers; appraisal, and agricultural-engineering consultant service.

**Equipment.**—The offices, classrooms, and shops used in Agricultural Engineering are in the Agricultural Engineering Building. The laboratories have the latest labor-saving farm equipment for seedbed preparation, planting, cultivating, harvesting, and crop preparation. These machines are furnished by the leading farm-machinery manufacturers, and are replaced from time to time as improvements are developed. Special effort is made to have on hand all types of equipment for use in the best practices in the production of farm crops.

The Farm Buildings Laboratory is equipped with drawing tables, supply cabinets, and models of various types of farm-buildings construction.

Laboratory Equipment for Soil Conservation, such as that for terracing and gully control, consists of sets of surveying and leveling instruments.

Practice.—Field areas in crops, vineyards, orchards, and pastures are available for practice in the use of farm equipment, and in drainage and erosion control.

A Bulletin Library of Agricultural Engineering is maintained for student reference.

## CURRICULUM IN AGRICULTURAL ENGINEERING

### Freshman Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Algebra, Trigonometry, and Analytical Geometry, Math. 101, 102, 103 . . . . .	6	6	6
Composition, Eng. 101, 102, 103 . . . . .	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
Engineering Drawing II, M.E. 105, 106 . . . . .	3	3	0
Descriptive Geometry, M.E. 107 . . . . .	0	0	3
Military Science I, Mil. 101, 2, 3, or alternate . . . . .	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103 . . . . .	1	1	1
	19	19	19

Summer requirement:—Surveying, C. E. s.200.

### Sophomore Year

Engineering Geology, Geol. 220 . . . . .	0	0	3
Calculus I, II, III, Math. 201, 202, 303 . . . . .	4	4	4
Business English, Public Speaking, Eng. 211, 231 . . . . .	3	0	3
Physics for Engineers, Phys. 201, 202, 203 . . . . .	4	4	4
Farm Equipment, Agr. Eng. 202 . . . . .	0	3	0
General Botany, Bot. 102 . . . . .	0	4	0
General Zoology, Zool. 101 . . . . .	4	0	0
Economic History, Hist. 101, 102, 103 . . . . .	3	3	3
Military Science II, Mil. 201, 2, 3, or alternate . . . . .	2	2	2
Sport Activities, P.E. 201, 202, 203 . . . . .	1	1	1
	21	21	20

### Junior Year

#### Required for All Options

General Economics, Econ. 201, 202 . . . . .	3	3	0
Agricultural Econ., Ag. Econ. 202 . . . . .	0	0	3
Terracing and Drainage, Agr. Eng. 303 . . . . .	0	0	3
Farm Shop, Agr. Eng. 331, 332 . . . . .	3	3	0
General Field Crops, F.C. 202 . . . . .	0	3	0
General Horticulture, Hort. 203 . . . . .	0	0	3
Farm Buildings, Agr. Eng. 322 . . . . .	0	3	0
	6	12	9

Choice must be made of one of the following options:

#### General Option

Animal Nutrition I, A. H. 202 . . . . .	0	3	0
Extension Methods, Ag. Econ. 450 . . . . .	3	0	3
Engineering Mechanics, E.M. 311, 312, 313 . . . . .	3	3	3
Strength of Materials, E.M. 321 . . . . .	0	0	0
Soils, Soils 201 . . . . .	5	0	0
**Electives . . . . .	3	3	3
	14	9	9

\*\* Three credits per term to be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

## STATE COLLEGE CATALOG

## Rural Structures Option

COURSES	CREDITS		
	First Term	Second Term	Third Term
Materials of Construction, C.E. 321	3	0	0
Engineering Thermodynamics II, M.E. 307-S-9	3	3	3
Perspective Drawing Arch. 206	1	0	0
Engineering Mechanics, E.M. 311-12-13	3	3	3
Strength of Materials, E.M. 321	0	0	3
**Electives	3	3	3
	<hr/>	<hr/>	<hr/>
	13	9	12

## Land Improvement Option

Soils, Soils 201	5	0	0
Fertilizers, Soils 302	0	3	0
Int. to Organic Chemistry, Chem. 221	4	0	0
Engineering Mechanics, E.M. 311, 312, 313	3	3	3
Pastures and Forage Crops, F.C. 448	0	0	4
**Electives	3	3	3
	<hr/>	<hr/>	<hr/>
	15	9	10

## Power and Machinery Option

Mechanical Drawing, M.E. 211-12-13	2	2	2
Foundry, M.E. 122	1	0	0
Forging and Welding, M.E. 126	2	0	0
Elementary Mechanism, M.E. 215-16-17	1	1	1
Metallurgy, M.E. 222, 223	0	3	3
**Electives	6	3	3
	<hr/>	<hr/>	<hr/>
	12	9	9

## Senior Year

## Required for all Options.

Rural Electrification, Agr. Eng. 432	0	3	0
Special Problems in Agr. Eng., Agr. Eng. 431	3	0	0
Senior Seminar, Agr. Eng. 491, 492, 493	1	1	1
Farm Management I, Ag. Econ. 303	0	0	3
Technical Writing I, Eng. 321	0	3	0
Rural Sociology, Rur. Soc. 302	0	3	0
	<hr/>	<hr/>	<hr/>
	4	10	4

Choice must be made of one of the following Options

## General Option

Dairy Machinery, A.H. 362	0	1	0
Dairy Cattle and Milk Production, A.H. 321	3	0	0
Farm Machinery and Tractors, Agr. Eng. 313	0	0	3
Erosion Prevention, Ag. Eng. 403	0	0	3
Farm Structures, Agr. Eng. 423	0	0	3
Soil Conservation and Land Use, Soils, 433	0	0	3
Principles of Forestry, For. 111	3	0	0
Cereal Crops, F.C. 302	0	3	0
General Poultry, Poul. 201	3	0	0
**Electives	6	6	6
	<hr/>	<hr/>	<hr/>
	15	10	15

\*\* Three credits per term to be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

## Rural Structures Option

COURSES	CREDITS		
	First Term	Second Term	Third Term
Graphic Statics, C.E. 423	1	0	0
Electrical Equipment for Building, E.E. 343	0	0	3
Construction Engineering I, C.E. 361, 362, 363	3	3	3
General Poultry, Pou. 201	3	0	0
Farm Structures, Agr. Eng. 423	0	0	3
Dairy Cattle and Milk Production, A.H. 321	3	0	0
Heating and Air Conditioning I, M.E. 404	0	3	0
Refrigeration, M.E. 405	0	0	3
**Electives	3	3	3
	13	9	15

## Land Improvement Option

Hydraulic Structures, C.E. 443	0	0	3
Soil Conservation and Land Use, Soils 433	0	0	3
Erosion Prevention, Agr. Eng. 403	0	0	3
Soils of North Carolina, Soils 312	0	3	0
Farm Machinery and Tractors, Agr. Eng. 313	0	0	3
Land Economics, Ag. Econ. 212	0	3	0
Principles of Forestry, For. 111	3	0	0
Fluid Mechanics, E.M. 330	3	0	0
**Electives	9	3	3
	15	9	15

## Power and Machinery Option

Farm Machinery and Tractors, Agr. Eng. 313	0	0	3
Dairy Machinery, A.H. 362	0	1	0
Special Problems, Agr. Eng. 481, 483	3	0	3
Engineering Mechanics, E.M. 311, 312, 313	3	3	3
Elements of Electrical Eng. I, E.E. 320, 321	3	3	0
Electrical Equipment of Buildings, E.E. 343	0	0	3
**Electives	6	3	3
	15	10	15

## AGRONOMY

Professor R. W. Cummings, Head of the Department

Professor Emeritus C. B. Williams

The teaching in this department is divided into two sections: Field Crops Section and Soils Section. Its objective is to provide a well-rounded practical as well as technical training for students in field crops, plant breeding, soils, fertilizers and other closely related subjects.

The combined facilities of the Consolidated University and of the Experiment Station provide excellent opportunities for advanced training leading to M.S. and Ph.D. degrees in Agronomy.

The advanced courses offered fulfill the needs of graduate work in all phases of Agronomy.

\*\* Three credits per term to be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

## FIELD CROPS SECTION

Professor G. K. Middleton, Head of Section

Associate Professors R. L. Lovvorn, J. A. Rigney, A. D. Stuart; Assistant

Professors B. W. Smith, W. C. Gregory.

Approximately eighty per cent of the farm income in North Carolina is from field crops, and their annual value is such that the State ranks third in the Nation in cash income from this source. The curriculum in this Section is set up to give definite instruction on the crops produced in the State and in plant breeding.

This curriculum is flexible, making it possible for students to elect sufficient courses in other departments for a general training in Agriculture, or for specialization in preparation for graduate work in Agronomy. The more general training will equip them for work with the Agricultural Extension Service or in one of the several agencies administered by the U. S. Department of Agriculture; or as better farmers.

Advanced training is provided for those who desire to go into the more technical phases of crop production or plant breeding, such as teaching or research in State or Federal institutions.

## CURRICULUM IN FIELD CROPS

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
English	3	3	3
Soils of N. C., Soils 312	0	3	0
Fertilizers, Soils 302	0	3	0
Soil Management, Soils 303	0	0	3
Cereal Crops, F.C. 302	0	3	0
Pastures and Forage Crops, F.C. 443	0	0	4
Diseases of Field Crops, Bot 301	3	0	0
Major Options	6	3	4
Electives	6	4	4
	18	19	18

## Senior Year

Genetics, Zool. 411	4	0	0
Plant Breeding, F.C. 463	0	3	0
Major Option	4	3	0
Tech. Agr.	6	6	6
Electives	4	6	12
	18	18	18

## SOILS SECTION

Professor J. F. Lutz, Head of Section

Professor R. W. Cummings; Associate Professor E. R. Collins

Assistant Professors, W. D. Lee, J. R. Piland

The soil is a natural body composed of mineral and organic matter, air, water, and living micro-organisms. The reactions of and changes in these components extend into the fields of chemistry, geology, physics and biology, which sciences are fundamentals to soils. No state in the Union offers better opportunities for soil and fertilizer studies than North Carolina for within her borders are soils derived from a large variety of parent materials and developed under climatic conditions varying from a subtropical climate in the southeastern part of the state to the cooler climates of the mountains. This state has been one of the few which has steadily pushed forward her soil-survey work so that now county soil-survey reports and maps are available for practically all the counties of the entire state.

The importance of soils in North Carolina agriculture is evidenced by the fact (1) that more fertilizer is used in North Carolina than in any other state in the Union and (2) that North Carolina ranks third among the states in cash income derived from farm crops.

Students are given practical training in the properties and management of soils which equips them for general agricultural work, such as farmers, county agents, and vocational teachers. Advanced training is provided for those who desire to go into the more technical phases of soils, such as teaching or research in State or Federal institutions. The flexibility of the curriculum in soils, through a sufficient number of optional courses, permits the student to choose the type of training he desires.

## CURRICULUM IN SOILS

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
English or Modern Language .....	3	3	3
Fertilizers, Soils 302 .....	0	3	0
Soil Management, Soils 303 .....	0	0	3
Cereal Crops, F.C. 302 .....	0	3	0
Pasture and Forage Crops, F.C. 443 .....	0	0	4
Qualitative and Quantitative Analysis, Chem. 211, 212, 213 .....	4	4	4
Major Options .....	6	0	0
Electives .....	6	6	3
	<hr/>	<hr/>	<hr/>
	19	19	17

## Senior Year

Genetics, Zool. 411 .....	4	0	0
*Plant Breeding, F.C. 463 .....	0	3	0
Major Options .....	6	6	6
Technical Agriculture .....	6	6	6
Electives .....	3	3	6
	<hr/>	<hr/>	<hr/>
	19	18	18

\* F.C. 312, Tobacco Production or F.C. 323, Cotton Production or F.C. 461, Taxonomy of Field Crops, may be substituted for Plant Breeding.

**ANIMAL HUSBANDRY AND DAIRYING**

Professor J. H. Hilton, Head of the Department

Professors R. H. Ruffner, E. H. Hostetler, W. J. Peterson, W. L. Clevenger, J. E. Foster, F. M. Haig; Associate Professors C. D. Grinnells, D. E. Brady.

The Department of Animal Husbandry and Dairying is housed in Polk Hall, a three-story building which was designed to meet the needs of college instruction, research, and extension work in Animal Production and Dairy Manufacturing.

In the basement of Polk Hall are two wings, one of which is devoted to Dairy Manufacturing and the other to Farm Meats. The Dairy wing has recently been equipped with new dairy machinery, including direct-expansion ice cream freezer, churn, pasteurizer, milk bottler, and milk-cooling and storage equipment. This equipment is used daily by students who bottle milk, and manufacture ice cream and other dairy products used in the College Cafeteria. The other wing is used for slaughtering beef cattle, sheep, and swine, and for the aging and curing of the meats produced from these animals. Sufficient equipment is provided in the Meat Laboratory to do the necessary work in the time allotted, yet the courses are so adapted that the students can apply both theory and practice to conditions on the farm. Both the dairy and the meat wings have their own individual mechanical refrigeration units so that the courses can be taught at any season of the year.

The upper floors of the building contain offices, classrooms, library, milk-testing laboratory, farm-dairy laboratory, animal-nutrition laboratories, and beef cattle, sheep, and swine research laboratories. Extension specialists in swine, dairy, beef, and sheep have offices in this building.

In addition, the Department of Animal Husbandry and Dairying maintains three livestock farms located a few miles from the College.

The Dairy Farm contains 400 acres. Two fire-proof completely equipped dairy barns house 140 registered Jerseys, Guernseys and Holsteins. A herd of registered Ayrshires is maintained at the College Experiment Station nearby. A milk house, designed for convenience in handling milk in the most efficient and sanitary manner, connects the two barns. Other buildings located on the dairy farm are horse and calf barns.

The Animal Husbandry Farm adjoining the Dairy Farm contains 500 acres. Here registered breeds of swine, sheep, horses, and beef cattle are maintained for research and college teaching.

The Department of Animal Husbandry and Dairying is equipped to instruct students in the feeding, breeding, and management of farm animals. Students feed and milk cows; conduct research; manufacture dairy products; feed and prepare animals for exhibition and the block, actually doing the slaughtering, and the cutting of the meat for market and home use.

Well-trained young men in the various fields of Animal Husbandry and Dairying have greater opportunities for service and success than ever before. This fact is demonstrated by the following responsible positions held by graduates in Animal Husbandry and Dairying:

1. Livestock and dairy farmers.
2. County agents and extension specialists in livestock.
3. Livestock research investigators.
4. Superintendents and owners of dairy manufacturing plants.
5. Teachers in agricultural colleges.
6. Managers and salesmen in commercial livestock and feed companies.
7. Milk inspectors.
8. Workers for livestock breed associations.
9. Workers for banks and corporations in livestock industries.
10. Supervisors of dairy herd improvement associations.

### CURRICULUM IN ANIMAL PRODUCTION

For Freshman and Sophomore Years refer to pages 63, 64.

#### Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Dairying, A.H. 341	0	3	0
Swine Production, A.H. 331	3	0	0
Farm Meats I, A.H. 301	0	3	0
Animal Nutrition II, A.H. 361	3	0	0
History of Breeds, A.H. 322	0	3	0
Market Types of Livestock, A.H. 323	0	0	3
Herd Improvement, A.H. 413	0	0	3
Business English, Eng. 211	0	0	3
Public Speaking, Eng. 231	0	3	0
Elective English	3	0	0
Genetics, Zool. 411	4	0	0
Pastures and Forage Crops, F.C. 443	0	0	4
Chemistry of Vitamins, Chem. 462	0	3	0
Market Grading of Field Crops, F.C. 451	3	0	0
Animal Hygiene and Sanitation, A.H. 353	0	0	3
Electives	3	3	3
	—	—	19
	19	18	19

#### Senior Year

Animal Breeding, A.H. 421	4	0	0
Sheep Production, A.H. 313	0	0	3
Beef Cattle, A.H. 372	0	3	0
Pure Bred Livestock Production, A.H. 432	0	3	0
Stock Farm Management, A.H. 433	0	0	3
Horse and Mule Production, A.H. 351 or Dairy Cattle and Milk Production, A.H. 321	3	0	0
Senior Seminar, A.H. 391-392-393	1	1	1
Incubation and Brooding, Poul. 303	0	0	3
Terracing and Drainage, Agr. Eng. 303	0	0	3
General Bacteriology, Bot. 402	0	4	0
Fruit Growing, Hort. 331	4	0	0
Agricultural Marketing, Agr. Econ. 411	3	0	0
Testing of Milk Products, A.H. 332	0	4	0
Business Law, Econ. 307	0	0	3
Electives	3	3	3
	—	—	19
	18	18	19

## CURRICULUM IN DAIRY MANUFACTURING

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Creamery Buttermaking, A.H. 371	4	0	0
Testing of Milk Products, A.H. 332	0	4	0
Ice Cream Making, A.H. 381	4	0	0
Cheese Making, A.H. 333	0	0	3
Dairy Manufacturing Practice, A.H. 342	0	3	0
City Milk Supply, A.H. 343	0	0	4
Business English, Eng. 211	0	0	3
Public Speaking, Eng. 231	0	3	0
Elective English	3	0	0
Chemistry of Vitamins, Chem. 462	0	0	3
Animal Breeding, A.H. 421	4	0	0
Food and Nutrition, Chem. 482	0	3	0
Animal Hygiene and Sanitation, A.H. 353	0	0	3
Farm Engines, Agr. Eng. 212	0	3	0
Electives	3	3	3
	18	19	19

## Senior Year

Dairy Manufacturing, A.H. 362	0	1	0
Dairy Products Judging, A.H. 394	0	0	1
Dairy Manufactures, A.H. 401, 402, 403	3	3	3
Senior Seminar, A.H. 391, 392, 393	1	1	1
General Bacteriology, Bot. 402	0	4	0
Swine Production, A.H. 331	3	0	0
Animal Nutrition II, A.H. 361	3	0	0
Farm Meats I, A.H. 301	0	3	0
Business Law, Econ. 307	0	0	3
Herd Improvement, A.H. 413	0	0	3
Food Products and Adulterants, Chem. 441	3	0	0
Stock Farm Management, A.H. 433	0	0	3
Agricultural Marketing, Agr. Econ. 411	3	0	0
Farm Accounting, Agr. Econ. 313	0	0	3
Pure Bred Livestock Production, A.H. 432	0	3	0
Electives	3	3	3
	19	18	20

## BOTANY

Professor B. W. Wells, Head of the Department

Professors D. B. Anderson, S. G. Lehman, L. Shaw

Associate Professor I. V. Shunk

Assistant Professors M. F. Buell, L. A. Whitford

## Equipment and Facilities

Location.—The Department of Botany occupies the second floor of Winston Hall.

Laboratories.—The laboratories are all equipped with projection lanterns. A well-organized herbarium supports the work in systematic botany and dendrology.

Greenhouses.—Ample greenhouse facilities are available for work in physiology and pathology.

Purpose.—The Department emphasizes those phases of plant science which are foundational for the work in Agriculture and Forestry.

## CURRICULUM IN PLANT PATHOLOGY

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Business English, Eng. 211 . . . . .	0	0	3
Public Speaking, Eng. 231 . . . . .	0	3	0
Technical Writing II, Eng. 323 . . . . .	0	0	3
Bacteriology, Bot. 402 . . . . .	0	4	0
Diseases of Field Crops, Bot. 301 . . . . .	3	0	0
Diseases of Fruit and Vegetable Crops, Bot. 303 . . . . .	0	0	3
Plant Ecology, Bot. 441 . . . . .	3	0	0
Economic Entomology, Zool. 213 . . . . .	0	0	4
Plant Morphology, Bot. 411, 412 . . . . .	3	3	0
Genetics, Zool. 411 . . . . .	4	0	0
Electives . . . . .	6	8	5
	<hr/>	<hr/>	<hr/>
	19	18	18

## Senior Year

Plant Microtechnique, Bot. 451 . . . . .	3	0	0
Principles of Plant Pathology, Bot. 491 . . . . .	0	5	0
Pathogenic Fungi, Bot. 481, 2, 3 . . . . .	3	3	3
Soil Microbiology, Bot. 443 . . . . .	0	0	3
Plant Breeding, F.C. 463 . . . . .	0	0	3
Microanalysis of Plant Tissue, Bot. 442 . . . . .	0	3	0
Qualitative Analysis, Chem. 211 . . . . .	4	0	0
Quantitative Analysis, Chem. 233 . . . . .	0	0	4
Electives . . . . .	8	7	5
	<hr/>	<hr/>	<hr/>
	18	18	18

## CHEMISTRY

Professor A. J. Wilson, Head of the Department

Professors L. F. Williams, G. H. Satterfield

Associate Professors W. E. Jordan, M. F. Showalter, W. A. Reid

Assistant Professors H. L. Caveness, P. P. Sutton, R. H. Loeppert

Instructors R. C. White, J. W. Morgan

**Curriculum.**—The Department of Chemistry does not offer a Bachelor of Science degree in Chemistry. However, a student may register in the School of Agriculture with a major in Agricultural Chemistry. This curriculum affords extended courses of chemical training which will fit a graduate for positions such as those in State Experiment Stations, and in State and Federal laboratories for the inspection and control of fertilizers, feeds, foods, and other commodities, and as chemist in industrial plants.

**Instruction.**—Instruction in the Department of Chemistry embraces the courses of lectures and the related courses of laboratory work which are described in detail under the appropriate heading of each individual course included in the curricula of the Department.

## CURRICULUM IN AGRICULTURAL CHEMISTRY

For Freshman and Sophomore Years refer to pages 63, 64.

## Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
General Botany, Bot. 101	4	0	0
Economic Zoology, Zool. 102	0	4	0
Animal Physiology, Zool. 202, or Plant Physiology, Bot. 221	0	0	5
Qualitative Analysis, Chem. 211	4	0	0
Quantitative Analysis, Chem. 212, 233	0	4	4
Soils, Soils 201	5	0	0
Bacteriology, Bot. 402	0	4	0
Animal Nutrition I, A.H. 202	0	0	3
General Economics, Econ. 201, 202	3	3	0
Agricultural Economics, Agr. Econ. 202	0	0	3
Military Science II, Mil. 201, 202, 203, or alternate	2	2	2
Sport Activities, P. E. 201, 202, 203	1	1	1
	12	12	12

## Junior Year

Organic Chemistry, Chem. 421, 422, 423	4	4	4
Physics for Textile Students, Phys. 111, 112, 113	4	4	4
French or German	3	3	3
Elective Chemistry	3	3	3
Elective Agriculture	3	3	3
Electives	3	3	3
	20	20	20

## Senior Year

Chemistry Major	7	7	7
French or German	3	3	3
Electives	9	9	9
	19	19	19

## EXPERIMENTAL-STATISTICS

Professor Gertrude M. Cox, Head of the Department  
 Associate Professors R. E. Comstock, J. A. Rigney, J. M. Clarkson  
 Instructors R. J. Monroe, R. L. Anderson  
 Bureau of Agricultural Economics Resident Collaborators  
 W. A. Hendricks, Glen F. Vogel  
 Assistants in Statistics Virginia Montague, Margaret Fleming  
 Technical Assistants Sarah Porter, Anne Castleman

**Organization.**—The Department of Experimental-Statistics provides instruction, consultation and computational service for all other departments in all of the schools of the college. The Experiment Stations of North Carolina and other states look to the Department for assistance in design of experiments, analysis of data and interpretation of results. Many governmental agencies and other institutions also use the facilities. The range and quantity of material handled by the Department furnishes an excellent background for training students in the use of statistical procedures in almost any field.

**Laboratory.**—The Department maintains a laboratory which is equipped with the best facilities available. Calculating machines, comptometers and International Business Machines are used constantly. Students have an

excellent opportunity to get actual experience in the use of these machines and to learn the types of data for which each is best suited.

**Curriculum.**—The Department does not offer a Bachelor of Science degree in Experimental-Statistics, but it does offer advanced degrees and opportunities for research. Undergraduate courses are given in fundamental and applied phases of statistics.

## FORESTRY

Professor J. V. Hofmann, Director of the Division

Professor L. Wyman

Associate Professors W. D. Miller, G. K. Slocum, C. M. Kaufman

**Areas for Field Work.**—Some of the field work of the Department of Forestry is now carried on at the Camp Polk Prison Farm, near the State Fair Grounds, which has a thousand acres of timber land.

The George Watts Hill Demonstration Forest, near Durham, is a tract of 1,400 acres. It contains stands of short-leaf and loblolly pine, oaks, gum, tulip, dogwood, and all of these species in different associations. A rolling terrain, it serves admirably for the study of forest problems in the Piedmont Section.

**The Hofmann Forest.**—A large tract of land in Jones and Onslow Counties, in the southeastern part of the State, consists of more than 80,000 acres and has the various types of timber found in this region. The large areas of virgin timber make a very complete laboratory for studying forest development and succession.

**Total Areas.**—In all, the Forestry Department has available about 82,000 acres on which to do field work, demonstration, and research. These areas include the various types found in North Carolina except those of the Mountain Region.

The Arboretum area of seventy acres near Raleigh is being developed to contain all of the tree species and associated shrubs that grow in this climatic condition. It contains swamp and upland which adapts it for this use. More than a hundred species have been planted in this area.

The Wood Technology Laboratory contains a representative collection of the more common woods and will be gradually extended.

The Timber-Testing Laboratory, in connection with the Engineering Experiment Station, contains the machines for its work.

Greenhouse space is available for special problems in forest research.

**Purposes of the Curriculum.**—The aims of the curriculum in Forestry are: (1) to train young men for work in the technical and applied fields of forestry on public or private forest land; (2) to give special training in fields of research; (3) to advance the knowledge of the entire profession.

**Forestry as a Profession.**—The profession of forestry is comparatively young in North Carolina. It began some thirty years ago and has made remarkable progress during its first quarter century of existence. The next decade promises more advancement and achievement than all the past, as the foundation has been laid; the building of the superstructure will depend

upon the expertness of the builders. In the ranks of the builders are included the United States Forest Service; State Forest Departments in a large number of States; corporations and lumber companies; individual land-owners; last but by no means least, the farm woodlands.

**Occupations.**—Students completing the Forestry course may look to the following fields of employment: United States Forest Service, the State Service, including not only North Carolina but especially the Southern States, and other State organizations; the lumber companies, timber-holding companies, corporations, and individuals. The forestry program in the State of North Carolina is very materially strengthened by the presence of the National Forests and the Appalachian Forest Experiment Station. These will be of direct aid in the study of forest-research problems, management problems and the organization and work of the National Forest Service.

**Forest Management** aims to make a forest property a permanent producing unit. All forestry is now being built on this basis.

**Forest Utilization** requires special courses dealing with the value and various uses of the products of the forest. During the third term of the senior year, field studies of woodworking industries, logging operations, paper and pulp mills, and problems in forest management take up most of the time.

**Silviculture** deals with the problems of producing a forest, such as selection of species, methods of reproduction, cutting systems. The work is becoming increasingly important as our virgin timber supply is depleted.

**Research in Forestry** is being recognized as important by all agencies in the fields of forestry. Men trained in research methods are needed in the Government Experiment Stations, State Experiment Stations, and private laboratories.

**Graduation.**—A minimum of 237 term credits with at least 237 honor points are required for graduation in Forestry.

A Field Trip through the Southeastern and the Gulf States is required for the senior class to study Applied Forestry under field and factory conditions. Local field trips are also required of other classes. A nominal fee is charged to cover the expense of these trips.

**Summer Instruction in Forestry.**—The regular summer instruction in forestry for sophomores is given during the ten weeks immediately following the Commencement.

The expenses for the entire period are as follows:

Registration fee .....	\$ 5.00
For each credit scheduled .....	3.00
Room and board (estimated) .....	50.00
Bus fee .....	22.00
Camp fee .....	5.00

The courses listed below for summer camp are required and carry the regular college credit as indicated. The work is carried on entirely in the field and the class is responsible for its own program of camp routine. The

students furnish their own board and any facilities other than the beds and housing. The registration in these courses is restricted to regularly enrolled students, unless a student is admitted as a special student under the same conditions that a special student would be allowed to take work in the regular courses.

### CURRICULUM IN FORESTRY

#### Freshman Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Drawing, C.E. 101, 102, 103	1	1	1
Botany, General and Systematic Bot. 101, 102, 203	4	4	3
Mathematical Analysis, Math. 111, 112, 113	4	4	4
Composition, Eng. 101, 102, 103	3	3	3
General and Economic Zoology, Zool. 101, 102	4	4	0
Economic Entomology, Zool. 213	0	0	4
Elementary Forestry, For. 101, 102, 103	1	1	1
Military Science I, Mil. 101, 102, 103, or Human Relations, Soc. 101, 102, 103	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103	1	1	1
	—	—	—
	20	20	19

#### Sophomore Year

Introduction to Economics, Econ. 205	3	0	0
Land Economics, Agr. Econ. 212	0	3	0
Plant Physiology, Bot. 221	5	0	0
Dendrology, Bot. 211, 213	3	0	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Wood Technology, For. 202	0	3	0
Physical Geology, Geol. 120	0	4	0
Surveying, Theoretical, C.E. 221, 222	0	3	3
Field Surveying, C.E. 225	0	1	0
Topographical Drawing, C.E. 224	0	0	1
Introduction to Psychology, Psychol. 200	0	0	3
Military Science II, Mil. 201, 202, 203, or World History, Hist. 104	2	2	2
Sport Activities, P.E. 201, 202, 203	1	1	1
Introduction Sociology, Soc. 202	0	0	3
	—	—	—
	18	21	20

#### Summer Camp

Surveying and Mapping, C.E. s300	0	0	3
Dendrology, For. s214	0	0	3
Mensuration, For. s304	0	0	3
Silviculture, For. s204	0	0	3
	—	—	—
	—	—	12

#### Junior Year

Forest Protection and Improvement, For. 342	0	3	0
Nursery Practice, For. 313	0	0	1
Soils, Soils 201	0	0	5
Mensuration I, II, For. 402, 403	3	3	0
Silviculture I, II, For. 311, 312	3	3	0
English or Modern Language	0	3	3
Forest Entomology, Zool. 302	0	3	0
Plant Ecology, Bot. 441	3	0	0
Meteorology, Phys. 322	0	3	0
Forest Finance, For. 442	3	0	0
Survey of Statistical Methods, Econ. 408	3	0	0
Elective in Social Science Group	0	0	6
Electives	3	3	6
	—	—	—
	18	21	21

## Senior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Logging, For. 421 .....	3	0	0
Diseases of Forest Trees, Bot. 311 .....	3	0	0
Silviculture III, IV, For. 411, 412 .....	3	3	0
Forest Management, For. 431, 432 .....	3	3	0
Seminar, For. 452 .....	0	2	0
Forest Products, For. 821 .....	3	0	0
Forest Utilization, For. 323 .....	0	0	2
Timber Appraisal, For. 448 .....	0	0	2
English or Modern Language .....	0	3	0
Senior Field Trip, For. 453 .....	0	0	3
Electives .....	3	6	5
	—	—	—
	18	17	12

## HORTICULTURE

Professor M. E. Gardner, Head of the Department

Associate Professors G. O. Randall, Robert Schmidt, J. G. Weaver

**Equipment.**—The Department of Horticulture is well prepared in classrooms and in laboratory and field equipment to offer instruction in its several important and diverse fields.

**Pomology and Small-Fruit Culture.**—The College orchards and vineyards, the laboratories, a nursery plot, and other facilities are available to treat every phase of fruit growing from the selection and propagation of varieties to the details of orchard management.

**Olericulture and Floriculture.**—Four modern greenhouses, forming an important part of the equipment of the Department, are used primarily for experimental and instructional work in these two important and growing fields of horticulture. Potting rooms, propagation benches, and other more specialized equipment are used for both undergraduate and graduate instruction. Land and equipment to demonstrate and study details of commercial olericulture are convenient to the greenhouses.

**Special Study and Research.**—A Physiological and a Cytological Laboratory, calculating machines, library, greenhouses, and land are available to graduate and undergraduate students to carry on special studies. Projects conducted by the Experiment Station Staff are also available for study and observation.

**Library.**—The Departmental library contains approximately twenty thousand technical and popular bulletins covering all phases of horticulture, and complete bound volumes of the Proceedings of the American Society for Horticultural Science and many other periodicals pertaining to horticultural subjects.

## CURRICULUM IN FLORICULTURE

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Public Speaking, Eng. 231	3	0	0
Business English, Eng. 211	3	0	0
Bacteriology, Bot. 402	0	4	0
Systematic Botany, Bot. 203	0	0	3
Disease of Fruit and Vegetable Crops, Bot. 303	0	0	3
Genetics, Zool. 411	4	0	0
Economic Entomology, Zool. 213	0	0	4
Plant Propagation, Hort. 301	0	3	0
Soils of North Carolina, Soils 312	0	3	0
Fertilizers, Soils 302	0	3	0
Plant Materials: Woody Plants, L.A. 201, 202, 203	2	2	2
Terracing and Drainage, Agr. Eng. 303	0	0	3
Plant Materials: Herbaceous Plants, L.A. 303	0	0	2
Electives	6	3	3
	18	18	20

## Senior Year

Plant Ecology, Bot. 441	3	0	0
Technical Writing II, Eng. 323	0	0	3
Commercial Floriculture, Hort. 341	4	0	0
Horticultural Problems, Hort. 421, 422, 423	2	2	2
Seminar, Hort. 431, 432, 433	1	1	1
Experimental Horticulture, Hort. 412	0	3	0
Agricultural Cooperation, Agr. Econ. 422	0	3	0
Rural Sociology, Rural Soc. 302	0	3	0
Agricultural Chemistry, Chem. 431	3	0	0
Plant Breeding, F.C. 463	0	0	3
Applied Psychology, Psychol. 337	0	3	0
Landscape Gardening, L.A. 403	0	0	3
Floral Design, Hort. 312	0	1	0
Electives	5	3	6
	18	19	18

## CURRICULUM IN POMOLOGY

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

Public Speaking, Eng. 231	3	0	0
Business English, Eng. 211	0	3	0
Systematic Botany, Bot. 203	0	0	3
Plant Ecology, Bot. 441	3	0	0
Small Fruits and Grapes, Hort. 311	3	0	0
Plant Propagation, Hort. 301	0	3	0
Vegetable Gardening, Hort. 303	0	0	4
Fertilizers, Soils 302	0	3	0
Terracing and Drainage, Agr. Eng. 303	0	0	3
Ornamental Plants, L.A. 402	0	2	0
Landscape Gardening, L.A. 403	0	0	3
Genetics, Zool. 411	4	0	0
Economic Entomology, Zool. 213	0	0	4
Applied Psychology, Psychol. 337	0	3	0
Electives	3	6	3
	19	17	20

## Senior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Bacteriology, Bot. 402	0	4	0
Diseases of Fruit and Vegetable Crops, Bot. 303	0	0	3
Technical Writing, Eng. 223	0	0	3
Systematic Pomology, Hort. 401	2	0	0
Fruit Growing, Hort. 331	4	0	0
Horticultural Problems, Hort. 421, 422, 423	2	2	2
Seminar, Hort. 431, 432, 433	1	1	1
Experimental Horticulture, Hort. 412	0	3	0
Farm Management I, Agr. Econ. 308	0	0	2
Plant Breeding, F.C. 463	0	0	3
Farm Meats I, A.H. 301	0	3	0
Agricultural Chemistry, Chem. 481	3	0	0
Rural Sociology, Rur. Soc. 302	0	3	0
Poultry Elective	3	0	0
Electives	3	3	3
	18	19	18

## CURRICULUM IN VEGETABLE GARDENING

For Freshman and Sophomore Years refer to pages 63, 64.

## Junior Year

Public Speaking, Eng. 231	3	0	0
Business English, Eng. 211	0	3	0
Plant Ecology, Bot. 441	3	0	0
Bacteriology, Bot. 402	0	4	0
Systematic Botany, Bot. 203	0	0	3
Diseases of Fruit and Vegetable Crops, Bot. 303	0	0	3
Fruit Growing, Hort. 331	4	0	0
Plant Propagation, Hort. 301	0	3	0
Vegetable Forcing, Hort. 302	0	0	4
Vegetable Gardening, Hort. 303	0	0	0
Fertilizers, Soils 302	0	3	0
Genetics, Zool. 411	4	0	0
Economic Entomology, Zool. 213	0	0	4
Terracing and Drainage, Agr. Eng. 303	0	0	3
Electives	6	3	3
	20	19	20

## Senior Year

Technical Writing II, 323	0	0	3
Systematic Olericulture, Hort. 411	2	0	0
Small Fruits and Grapes, Hort. 311	3	0	0
Horticultural Problems, Hort. 421, 422, 423	2	2	2
Seminar, Hort. 431, 432, 433	1	1	1
Experimental Horticulture, Hort. 412	0	3	0
Home Floriculture, Hort. 313	0	0	3
Agricultural Chemistry, Chem. 481	3	0	0
Plant Breeding, F.C. 463	0	0	3
Ornamental Plants, L.A. 402	0	2	0
Landscape Gardening, L.A. 403	0	0	3
Agriculture Cooperation, Agr. Econ. 422	0	3	0
Dairying, A. H. 341	3	0	0
Soils of North Carolina, Soils 312	0	3	0
Rural Sociology, Rur. Soc. 302	0	3	0
Electives	3	3	3
	20	20	18

### LANDSCAPE ARCHITECTURE

Professor J. P. Pillsbury, Head of the Division

Associate Professors G. O. Randall, J. G. Weaver

A comparative study of Landscape Architecture with architecture, the oldest art of design, will disclose the fact that distinct parallelism exists between these two fields of human endeavor. Not only in the character and extent of the training required in each case is this shown, but also in the division of work which takes place, and in the relations existing among those responsible for various parts of the work in the practice of these two closely associated professional fields.

**Training in Landscape Architecture** is a composite derived from the fine arts, certain branches of engineering, and ornamental horticulture. Properly, it is dominated by the principles of design, and therefore may be correctly classified as a fine art. Its province is the design of landscapes, the preparation of plans and specifications for them, and supervision during construction.

The Curriculum in Landscape Architecture is strictly undergraduate. Its purpose is to provide a broad and thorough foundation for the additional postgraduate training which the profession requires of those desiring to enter its ranks. It also presents an open door to the professional fields of city or regional planning as the student may elect when undertaking graduate work. The soundness of the curriculum here presented is attested not only by the fact that at no time has the demand for the services of its graduates been fully satisfied, but also by the successes of those who have pursued graduate training and attained to full rank in the professional field of Landscape Design.

**Training in Landscape Construction** is similar to that in Landscape Architecture, but with emphasis upon materials and methods of construction employed in engineering and ornamental horticulture.

**Training in Landscape Gardening** is essentially ornamental horticulture. In neither case is graduate work required, since their provinces will not include the design of landscape, but only the execution of plans under supervision in the one case, and the maintenance of the constructed landscape in the other. Students electing either of these two lines of study will, during their first two years, pursue the **Basic Curriculum in General Agriculture**, with two or three substitutions from other curricula, as indicated.

**General Equipment and Special Facilities** for instruction are ample in the combined resources of Civil and Architectural Engineering, Horticulture, and Landscape Architecture.

**Plant Materials** in extensive collections on the College grounds and at various points elsewhere within a short distance, furnish an ample supply of all kinds for both study and use. In addition, several notable collections are available for occasional visits and study.

The Material for Landscape Design and Construction available on College grounds, private properties, and numerous public and semipublic areas and institutions in and about Raleigh, provide a wide range of subjects for study and practice. The City of Raleigh itself is a most interesting city-planning study, since it is one of the very few existing examples of a capital city which was planned in advance of its building.

### CURRICULUM IN LANDSCAPE ARCHITECTURE

#### Freshman Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Algebra, Trigonometry, Analytical Geometry, Math. 101, 102, 103	6	6	6
Composition, Eng. 101, 102, 103	3	3	3
Botany, General and Systematic, Bot. 101, 102, 208	4	4	3
Engineering Drawing II, and Descriptive Geometry, M.E. 105, 106, 107	3	3	3
Arboriculture, L.A. 101, 102, 103	1	1	1
Drawing, C.E. 101, 102, 103	1	1	1
Military Science I, Mil. 101, 102, 103, or Human Relations, Soc. 101, 102, 108	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 108	1	1	1
	21	21	20

#### Sophomore Year

Business English and Public Speaking, Eng. 211, 231 ...	3	0	3
Plant Physiology, Bot. 221	0	0	5
Pencil Sketching, Arch. 100	3	0	0
Physical Geology, Geol. 120	0	4	0
Introduction to Economics, Econ. 205	0	3	0
Introduction to Psychology, Psychol. 200	3	0	0
Introduction to Architecture, Arch. 201	3	0	0
Elements of Architecture, Arch. 202, 203	0	3	3
Surveying, Theoretical, C.E. 221, 222	3	3	0
Field Surveying, C.E. 225, 227	1	0	1
Plant Materials: Woody Plants, L.A. 201, 202, 203	2	2	2
Theory of Landscape Design, L.A. 212, 213	0	3	3
Military Science II, Mil. 201, 202, 203, or World History, Hist. 104	2	2	2
Sport Activities, P.E. 201, 202, 203	1	1	1
	21	21	20

Surveying, C.E. s310, concurrent with Summer School, 3 credits, or  
Surveying, C.E. s310, a, b, c, Junior Year, 3 credits.

#### Junior Year

Plant Materials: Herbaceous Plants, L.A. 303	0	0	2
Plant Ecology, Bot. 441	3	3	0
History of Landscape Design, L.A. 311, 312	3	3	4
Landscape Design I, L.A. 321, 322, 323	4	4	4
Technical Writing, Eng. 321	0	0	3
Shade and Shadows, Arch. 205	2	0	0
Freehand Drawing I, Pen and Pencil Drawing, Arch. 102	0	2	0
Freehand Drawing II, Water Color, Arch. 101	2	0	0
Freehand Drawing III, Charcoal, Arch. 103	0	0	2
Surveying, C.E. s310 a, b, c	1	1	1
Economic Zoology and Entomology, Zool. 102, 213	0	4	4
History of Architecture, Arch. 321, 322	3	3	0
*Electives	3	3	3
	21	20	19

\* Elective credit must include 12 credits in Social Science.

## Senior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Planting Design, L.A. 411, 412, 413	3	3	3
Landscape Design II, L.A. 421, 422, 423	4	4	4
City Planning, L.A. 432	0	3	0
Landscape Construction, L.A. 451, 452, 453	2	2	2
Perspective Drawing, Arch. 206	1	0	0
Accounting for Engineers, Econ. 212	3	0	0
Appreciation of Fine Arts, Arch. 111, 112, 113	3	3	3
Business Law, Econ. 307	0	0	3
*Electives	3	3	3
	19	18	18

## POULTRY SCIENCE

Professor R. H. Dearstyne, Head of the Department

Assistant Professors N. W. Williams, H. C. Gauger, R. E. Greaves; Instructor D. W. Gregory.

Research Coöoperators: Zoölogy Department, Associate Professors C. H. Bostian, R. Harkema

**Laboratories:** The Poultry Department is housed on the second floor of Ricks Hall. It embraces the Disease Diagnostic, the Anatomy-Hematology, and the Disease Research Laboratories, the Incubator Room, and two Live Bird Laboratories. The laboratories are well equipped for teaching and research.

**The Seminar Room:** Affording access to technical and to popular publications, to preserved pathological specimens, is open to the students at all times.

**Purpose and Scope:** The Poultry Department, as a major division of the School of Agriculture and Forestry, serves North Carolina through teaching, research, and extension. Its research personnel embraces the field of avian genetics, parasitology, sero-bacteriology, histology, pathology and hematology. It has two poultry farms (chickens and turkeys) near the campus and two Experiment Station farms in the eastern and the western parts of the state. The staff devotes its full time to poultry problems of the student, the poultryman and the industry. It serves a chicken and turkey farm industry of nearly 10,000,000 birds in North Carolina valued at approximately \$30,000,000. It coöperates with the commercial concerns allied with poultry.

**Central Poultry Plant:** Consists of forty buildings located on seventeen acres. Six laying houses and sixteen mating pens house approximately 250 breeders and 1,500 layers. All layers of three breeds of chickens are pedigreed and trap-nested. About 4,000 chicks are produced each year, all of these being pedigreed. An 18,000-capacity incubator is used for teaching commercial incubation.

**Central Turkey Plant:** Consists of five new buildings located on twenty-five acres. One laying house and six mating pens house approximately 250 large bronze turkeys, all pedigreed and trap-nested. One 1,500-capacity incubator is used.

These two Plants provide abundant material for teaching and demonstrating principles of poultry management, breeding, judging and sanitation.

**Disease Diagnostic Laboratory:** Serves directly and indirectly the poultrymen of the State. Approximately 25,000 birds have been autopsied since 1923; 1,500 to 2,000 are now autopsied annually. One thousand or more poultrymen are reached each year by correspondence and 250 receive personal attention in the laboratory. The birds received serve as excellent material for teaching, for laboratory material in the courses in anatomy and poultry diseases, and for investigational work in avian bacteriology, sero-bacteriology, anatomy, histology, pathology, hematology and parasitology.

**Curriculum:** Is designed to broaden and to balance the training of undergraduate and graduate students in poultry husbandry. Emphasis is placed on those phases of biology, production, management, and sanitation which will enable the student to enter the fields of plant management, extension, or graduate research.

**Research:** A substantial research program is pursued in genetics, sero-bacteriology, histology, pathology, hematology and parasitology.

### CURRICULUM IN POULTRY SCIENCE

For Freshman and Sophomore Years refer to pages 63, 64.

#### Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
English Elective .....	0	3	0
Technical Writing II, Eng. 323 .....	0	0	3
Public Speaking, Eng. 231 .....	0	0	3
Poultry Anatomy, Poul. 311, 312 .....	3	3	0
Poultry Judging, Poul. 301 .....	4	0	0
Poultry Nutrition, Poul. 333 .....	0	0	4
Preparation and Grading of Poultry Products, Poul. 332 .....	0	3	0
Incubation and Brooding, Poul. 303 .....	0	0	3
Bacteriology, Bot. 402 .....	0	4	0
Genetics, Zool. 411 .....	4	0	0
Vertebrate Embryology, Zool. 461 .....	5	0	0
Cereal Crops, F.C. 302 .....	0	3	0
Farm Management I, Agr. Econ. 303 .....	0	0	3
Electives .....	3	3	3
	19	19	19

#### Senior Year

Poultry Diseases, Poul. 401, 402 .....	4	4	0
Sero-Diagnosis in Poultry Diseases, Poul. 403 .....	0	3	3
Commercial Plant Management, Poul. 412 .....	0	3	0
Selecting and Mating Poultry, Poul. 413 .....	0	0	3
Senior Seminar, Poul. 423 .....	0	0	3
Swine Production, A.H. 331 .....	3	0	0
Dairy Cattle and Milk Production, A.H. 321 .....	3	0	0
Fruit Growing, Hort. 331 .....	4	0	0
Turkey Production, Poul. 342 .....	0	3	0
Rural Sociology, Rur. Soc. 302 .....	0	3	0
Agr. Marketing, Agr. Econ. 411 .....	3	0	0
Terracing and Drainage, Agr. Eng. 303 .....	0	0	3
Chemistry of Vitamins, Chem. 462 .....	0	3	0
Electives .....	3	3	6
	20	19	18

## RURAL SOCIOLOGY

Professor C. Horace Hamilton, Head of the Department

Professors G. W. Forster, Sanford Winston

Assistant Professors Selz C. Mayo, L. Walter Seegers, William McGehee

**Objectives.**—The principal objectives of this department are: (1) to give all students an appreciation of the human and social values in agriculture and rural life; (2) to give the future farmer and rural citizens an understanding of the social problems of the rural community; (3) to train rural leaders in methods of group organization and social control; (4) to train a few exceptional young men in rural sociological research and extension methods.

**Relation to Other Departments.**—The Department of Rural Sociology is closely related to and dependent upon other Social Science Departments in the College and in the Consolidated University. Students specializing in rural sociology will be expected to take courses in such departments as: Sociology, Psychology, Statistics, Agricultural Economics, History, and Political Science. The Department of Rural Sociology functions also in a service capacity to Agricultural Departments. Students taking courses in technical agriculture may take one or more courses in Rural Sociology as an elective Social Science.

**Laboratory and Research Facilities.**—The Department of Rural Sociology is constantly engaged in statistical and sociological studies of rural population, rural standards of living, rural communities, and related problems. Funds, laboratory equipment and other facilities for this work are provided by the Agricultural Experiment Station and are available for the use of advanced students specializing in the field of Rural Sociology.

In a broader sense, the entire State is a laboratory for the study of rural social problems. Field trips and extended surveys may be carried out by advanced students during the summer months.

**New Opportunities.** The field of rural social work offers new opportunities for agricultural graduates who have specialized in rural sociology. There is a great need now for men particularly, to fill administrative positions in all kinds of social security and welfare organizations, public and private. The rural sociology curriculum is designed to prepare agricultural college graduates for advanced professional training in social work and administration.

**CURRICULA IN RURAL SOCIOLOGY**

For Freshman and Sophomore Years refer to pages 63, 64.

**Junior Year**

COURSES	CREDITS		
	First Term	Second Term	Third Term
English (to be selected) .....	3	3	3
General Sociology, Soc. 202, 203 .....	3	3	0
Rural Sociology, Rur. Soc. 302 .....	0	0	3
Introduction to Psychology, Psy. 200 .....	3	0	0
Psychology of Personality, Psy. 291 .....	0	3	0
History of American Agriculture, Hist. 319 .....	0	0	3
American Political Parties, Pol. Sc. 203 or American Gov't. Pol. Sc. 200 .....	3	0	0
State Government and Administration, Pol. Sc. 201 .....	0	3	0
Electives .....	6	6	9
	<hr/>	<hr/>	<hr/>
	18	18	18

**Senior Year**

The American Family .....	0	3	0
Rural Leadership, Rur. Soc. 401 .....	3	0	0
Rural Poverty and Relief, Rur. Soc. 432 .....	0	3	0
Community Organization, Rur. Soc. 413 .....	0	0	3
Rural Population Problems, Rur. Soc. 411 .....	3	0	0
Social Aspects of Land Tenure, Rur. Soc. 422 or Problems of Land Economics, Agr. Econ. 412 .....	0	3	0
Farm Management I, Agr. Econ. 303 .....	0	0	3
Agricultural Cooperation, Agr. Econ. 422 .....	0	3	0
Agricultural Marketing, Agr. Econ. 411 .....	3	0	0
Social Pathology, Soc. 401 .....	0	0	3
Survey of Statistical Methods, Econ. 408 .....	3	0	0
Experimental Statistics, Stat. 412 .....	0	3	0
Statistical Analysis of Social Data, Stat. 451 .....	0	0	3
Technical Agriculture .....	3	3	3
Electives .....	3	0	3
	<hr/>	<hr/>	<hr/>
	18	18	18

## ZOOLOGY AND ENTOMOLOGY

Professor Z. P. Metcalf, Head of the Department

Professors C. H. Bostian, T. B. Mitchell, B. B. Fulton, F. H. McCutcheon, R. O. Stevens; Associate Professor R. Harkema; Assistant Professors C. F. Smith. Instructors W. M. Kulash, M. W. Wing.

**Teaching and Research.**—The space devoted to Zoölogy is equipped to present the various subjects and to carry on research in its own and related fields. The Entomology Laboratory has a large Insectary with the usual equipment, and has an especially large collection of breeding animals for research and instruction in the field.

**Beekeeping.**—The Beekeeping Laboratory is well provided with apparatus to illustrate all phases of beekeeping. A small apiary is maintained on the College grounds.

**Graduate Work.**—The Technique and Graduate Laboratories are especially well equipped for the teaching of graduate work. The Museum contains a synoptic collection illustrating most groups of animals.

**Curricula.**—The Department of Zoölogy offers curricula in Entomology and in Wildlife Conservation and Management set forth as follows.

### CURRICULUM IN ENTOMOLOGY

For Freshman and Sophomore Years refer to pages 63, 64.

#### Junior Year

COURSES	First Term	Second Term	CREDITS Third Term
Systematic Zoology, Zool. 421, 422, 423	3	3	3
Genetics, Zool. 411	0	0	0
Comparative Anatomy, Zool. 222, 223	4	4	4
Modern Language	0	3	3
Systematic Botany, Bot. 208	3	0	3
Physiological Chemistry, Chem. 451, 452	0	3	0
Public Speaking, Eng. 231	3	3	0
Technical Writing II, Eng. 323	0	0	3
Electives	6	3	3
	19	19	19

#### Senior Year

Vertebrate Embryology, Zool. 461	5	0	0
Field Zoology, Zool. 433	0	0	4
Applied Entomology, Zool. 401, 402, 403	3	3	3
Modern Language	3	3	3
Beekeeping, Zool. 243	0	0	3
Plant Ecology, Bot. 441	3	0	0
Histology, Zool. 442	0	3	0
Bacteriology, Bot. 402	0	4	0
Electives	4	4	4
	18	17	17

**WILDLIFE CONSERVATION AND MANAGEMENT**

**Principles.**—The Wildlife Management Curriculum is based on the following fundamental principles: (1) All forms of wild animal life must be considered in any extensive system of wildlife management; (2) the animal life of any given area is in close relationship to the vegetation existing in that area; (3) in favorable environment, the species of wildlife will normally produce a surplus, a part of which can be harvested each year in a manner similar to the harvesting of other crops.

**Conservative Approach.**—Since wildlife management is just getting under way in this country, it would not seem advisable to encourage too rapid expansion of this profession at the present time, although there is a distinct need for a moderate number of well-trained men to promote and supervise wildlife management in the many sections of the country.

**Positions.**—The curriculum is designed to furnish a technical and practical background for the following types of positions: (1) Wildlife-Management Technicians in State Game and Fish Departments; (2) Biologists in the United States Biological Survey, Forest Service, Soil Conservation Service, National Park Service, and other Federal Land-Use Departments; (3) Game Managers on private preserves or leased areas, State game refuges, and on other land areas which are being developed primarily for wildlife.

**Research.**—Because of the great need for research and experimental work in this field, the required courses in the curriculum are also designed to give the basic technique necessary to students who may desire to enter this phase of wildlife management. Several elective courses will be available for junior and senior students to enable them to specialize in some particular phase of the work.

**State Advantages.**—Unusual advantages are offered to competent students by the wide range of natural environments in the North Carolina Coastal Plain, Piedmont, and Mountain Regions. Further advantages are available by reason of close coöperation with the State Division of Game and Inland Fisheries, and the opportunity to observe developments in wildlife management on the following areas: Mount Mitchell Game Preserve, Sandhill Land-Use Project, Soil Conservation Service Projects, Mattamuskeet Water Fowl Preserve, The Nantahala and Pisgah National Forests, The Great Smoky Mountain National Park, and private preserves in the Piedmont and on the Coastal Plain.

## CURRICULUM IN WILDLIFE CONSERVATION AND MANAGEMENT

## Freshman Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Composition, Eng. 101, 102, 103 . . . . .	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
Mathematical Analysis, Math. 111, 112 . . . . .	0	4	4
General Zoology, Zool. 101 . . . . .	4	0	0
Economic Zoology, Zool. 102 . . . . .	0	4	0
Physical Geology, Geol. 120 . . . . .	0	0	4
Economic History, Hist. 101, 102, 103 . . . . .	3	3	3
Elementary Wildlife Management, Zool. 111 . . . . .	1	0	0
Military Science I, Mil. 101, 102, 103, or alternate . . . . .	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103 . . . . .	1	1	1
	—	—	—
	18	21	21

## Sophomore Year

Agricultural Physics, Phys. 115 . . . . .	0	0	5
Botany, General and Systematic, Bot. 101, 102, 203 . . . . .	4	4	3
Introduction to Organic Chemistry, Chem. 221 . . . . .	0	0	4
Introduction to Economics, Econ. 205 . . . . .	3	0	0
Land Economics, Agr. Econ. 212 . . . . .	0	3	0
Public Speaking, Eng. 231 . . . . .	3	0	0
Comparative Anatomy, Zool. 222, 223 . . . . .	0	4	4
General Field Crops, F.C. 202 . . . . .	0	3	0
Ornithology, Zool. 251, 252, 253 . . . . .	2	2	2
Surveying, Theoretical, C.E. 221, 222 . . . . .	3	3	0
Surveying, Field, C.E. 225 . . . . .	1	0	0
Principles of Forestry, For. 111 . . . . .	3	0	0
Military Science II, Mil. 201, 202, 203, or alternate . . . . .	2	2	2
Sport Activities, P.E. 201, 202, 203 . . . . .	1	1	1
	—	—	—
	22	22	21

## Junior Year

Plant Propagation and Nursery Practice, Hort. 301 . . . . .	3	0	0
Dendrology, Bot. 211, 213 . . . . .	3	0	3
Plant Ecology, Bot. 441 . . . . .	3	0	0
Field Zoology, Zool. 433 . . . . .	0	0	4
General Bacteriology, Bot. 402 . . . . .	0	4	0
Economic Entomology, Zool. 213 . . . . .	0	0	4
Animal Physiology, Zool. 202 . . . . .	0	5	0
Wildlife Conservation, Zool. 321, 322, 323 . . . . .	3	3	3
Technical Writing II, Eng. 323 . . . . .	0	0	3
Soils, Soils 201 . . . . .	5	0	3
Electives . . . . .	3	6	3
	—	—	—
	20	18	20

## Senior Year

Aquatic Biology, Bot. 473 . . . . .	0	0	2
Elective Social Science . . . . .	3	0	0
Elective English . . . . .	3	0	0
Wildlife Management, Zool. 451, 452, 453 . . . . .	3	3	3
The Soils of North Carolina, Soils 312 . . . . .	0	3	0
Advanced Animal Ecology, Zool. 462, 463 . . . . .	0	3	3
Parasitology, Zool. 492, 493 . . . . .	0	3	3
Electives . . . . .	9	6	7
	—	—	—
	18	18	18

## THE AGRICULTURAL EXPERIMENT STATION

L. D. Baver, Director

**Establishment.**—The Agricultural Experiment Station was established in accordance with an Act of the General Assembly of 1877. Its progress has been enhanced by different Acts of Congress giving to the Station additional funds in 1887, 1906, 1925, and 1935. These are known as the Hatch, the Adams, the Purnell, and the Bankhead-Jones acts, respectively. The General Assembly has allocated to the Station annually certain funds from the general fund.

**Purpose.**—The purpose of the Agricultural Experiment Station is to study methods for economic production of the highest grades of livestock, poultry, and plants on the many soil types and varied conditions existing throughout the commonwealth; to study methods for the control of parasitic insects and organisms that cause serious economic losses of animals, poultry, and plants; to find and develop varieties of animals, poultry, and plants, new, and resistant to diseases and the changeable conditions prevailing in this State; and to perfect better marketing for all agricultural products.

**Work.**—The staff of the Agricultural Experiment Station conducts experiments throughout the State on areas owned by farmers, on six strategically located test farms, on farms rented for short periods, and in the greenhouses and laboratories of the College.

**Research.**—The agricultural research aims, through the discovery of new facts, to improve the well-being of farmers throughout the State; to strengthen the regulatory work of the State Department of Agriculture; to develop new and necessary facts for the teaching of sound agricultural principles by vocational agricultural instructors, agricultural extension agents, and agricultural instructors in the College.

**Experts.**—The Agricultural Experiment Station staff brings to the College many experts, whose teachings in many specialized fields of agriculture assure the maintenance of curricula of high standards. It contributes much to the advanced training of students who are destined to become the leaders, teachers, and investigators so necessary in the maintenance of agriculture on sound and economic planes.

**Publications.**—The Agricultural Experiment Station publishes many bulletins and scientific papers on results of research conducted by the staff. These are free and sent upon request of anyone in the State.

**Problems.**—The staff diagnoses and interprets many problems for the farmers of this State; holds council with farmers and others interested in the agricultural industry; discusses farming procedures over the radio, and writes many letters on the more specific problems of agriculture at the request of farmers, members of garden clubs, and of fertilizer, fungicide, and insecticide manufacturers. It takes part in many of the administrative functions of the College.

## COOPERATIVE AGRICULTURAL EXTENSION WORK

Dr. I. O. Schaub, Director

John W. Goodman, Assistant Director

Dr. Jane S. McKimmon, Assistant Director

Ruth Current, State Home Demonstration Agent

**Support.**—The Agricultural Extension Service of State College is conducted coöperatively with the United States Department of Agriculture and the one hundred counties of the State. The work is supported by Federal funds derived from the Smith-Lever Act of 1914, the Capper-Ketcham Act of 1928, and the Bankhead-Jones Act of 1935, from State appropriations and county appropriations. The Federal and State appropriations are used to maintain an administrative and specialist staff, and to supplement salaries and travel expenses of county Extension agents.

**Purpose.**—The purpose of the Extension Service is to teach by demonstration. In carrying out this purpose, the College maintains a staff of trained specialists, a system of county agents and assistant agents, and a corps of home-demonstration agents. Instruction is given at group meetings by method and result demonstrations, and by the written word, by training leaders, and through organized effort with clubs of men, women, and young people. In all of these activities, the plan is to carry the rural people of North Carolina the latest and best information obtainable for building a more prosperous and satisfying life on the farm. The Extension Service holds a number of short courses, both on the College campus and elsewhere over the State, that the greatest number of rural leaders may be trained for building better homes and better farms, in the use of more efficient practices, thus creating a more satisfying way of life.

## THE SCHOOL OF ENGINEERING

†John Harold Lampe, Dean of the School of Engineering  
L. L. Vaughan, M.E., Acting Dean of Engineering

### Organization

The School of Engineering of the North Carolina State College of Agriculture and Engineering of the University of North Carolina is organized for purposes of administration into the following Departments:

#### Line Departments

	Administrative Officer
Aeronautical Engineering .....	Professor W. G. Friedrich
Architectural Engineering .....	Professor Ross Shumaker
Ceramic Engineering .....	Professor A. F. Greaves-Walker*
Chemical Engineering .....	Professor E. E. Randolph
Civil Engineering .....	Professor C. L. Mann
Electrical Engineering .....	Professor R. S. Fouraker
General Engineering .....	Professor G. Wallace Smith
Geological Engineering .....	Professor J. L. Stuckey
Industrial Engineering .....	Professor F. F. Groseclose**
Mechanical Engineering .....	Professor R. B. Rice

#### Service Departments

Engineering Experiment Station .....	Assoc. Prof. R. E. Stiemke**
Engineering Mechanics .....	Professor G. Wallace Smith
Mathematics .....	Professor H. A. Fisher
Physics .....	Professor C. M. Heck

The School of Engineering is organized to offer technical and professional engineering instruction on the higher levels, undergraduate and graduate, vocational and professional, to meet the needs of the people of North Carolina. It is also organized and equipped to conduct research in the fundamentals of Engineering, and it coöperates with the College Extension Division in offering extension courses in Engineering and its allied fields.

Effective July 1, 1938, the consolidation of Engineering instruction at the University Unit in Raleigh was consummated, and the instructional staff and laboratory facilities were enhanced by additions from the Engineering College formerly maintained by the Unit at Chapel Hill. This gives the School of Engineering in Raleigh the largest and most extensive engineering staff and equipment in this section of the country, and offers to the young men of North Carolina excellent facilities for securing an undergraduate education in Engineering.

\* On leave.

\*\* On military leave.

† Appointed April 1, 1945.

The excellence of the instruction in the School of Engineering is attested by the fact that the Engineers' Council for Professional Development has accredited its curricula in Ceramic, Civil, Electrical, and Mechanical Engineering. It is the policy of the School of Engineering to have all of its curricula meet the standards of this nationally recognized accrediting agency. Engineering education requires extensive laboratory facilities, and as rapidly as funds are available all of its laboratories are being brought into shape to meet the highest standards attained in any technological institution of higher learning.

### Location and Facilities

Raleigh is a particularly favorable place for the study of Engineering. It is not only the State Capital where are located many State Departments of interest to engineers, such as the State Highway Commission, State Board of Health, State Geologist, Department of Conservation and Development, and important State institutions, but it is a rapidly growing city marked by modern developments in residential, commercial, and municipal construction. The local building and engineering go on the year round and afford excellent opportunities for observation and study. Raleigh is so situated geographically that it is within easy distance for inspection trips to commercial chemical works, woodworking mills, railway shops, machine shops, airports, and manufacturing industries.

Raleigh is also a center from which electric power is distributed to a large section of the State. A transformer and meter substation adjoins the campus, and from it high-tension lines radiate in four directions. Hydro-electric and steam-electric plants on the Cape Fear River are within easy reach. The important systems of highways centering in Raleigh are exceptionally valuable for the observation and study of the construction, use, and maintenance of roads.

On the State College campus are six large buildings devoted exclusively to engineering instruction and research. These buildings contain much laboratory equipment which can be inspected at any time, but is best seen during the Engineers' Fair, which is held each year in March or April.

### Purposes of the School

The purposes of the School of Engineering are: to educate men for professional service in Aeronautical, Architectural, Ceramic, Chemical, Civil, Construction and Building Materials, Electrical, Geological, Industrial, Mechanical, Sanitary, and Transportation Engineering; to equip them to participate in commercial and public affairs; to develop their capacities for intelligent leadership; to aid in the development of commerce and industry through research and experimentation; to investigate natural resources and demonstrate their value to the people of the State; to coöperate with private companies, municipalities, public authorities, and commercial and industrial organizations through scientific research, thus increasing technical skill, improving the value of manufactured products, and eliminating waste.

**Occupations Open to Graduates**

Those who graduate and receive a bachelor's degree in some specialized branch of engineering are equipped to assume at once the duties and responsibilities usually given Junior Engineers. The graduates of the School of Engineering are found in many technical fields, but most of them find employment in some one of the following: Aeronautical, Architectural and Structural Engineering; the Ceramic, the Chemical industries; and Private Professional Practice, Consulting Engineers; Hydro-electric Engineering, Electrical Manufacturing, Contracting, Central Steam-Electric Station Design and Construction, Telephone Service, Maintenance and Operation of Electrically-driven Mill Equipment, Lighting, Illumination, and Railway Signaling; Construction, Maintenance, and Operation of Steam and Electric Railways; the Design and Manufacture of Machinery, the Operation of Shops, and the Furniture Industry; Geological Engineering, Highway Engineering, Industrial Engineering, and the Management of Industries, Municipal Engineering, Sanitary Engineering; as City Managers, Public-Utility and Health-Service Officials; Sales Engineering, Research and Development.

**Curricula**

Besides a curriculum leading to the Bachelor of Science degree in General Engineering, the School of Engineering offers curricula which lead to the Bachelor's degree in the following specialized fields of Engineering:

Aeronautical Engineering

Architectural Engineering

Architecture

Ceramic Engineering

Chemical Engineering

Civil Engineering, with options in:

- (a) Construction and Building Materials
- (b) General Civil
- (c) Sanitary
- (d) Transportation

Electrical Engineering, with options in:

- (a) Power Generation and Distribution
- (b) Electrical Communication

Geological Engineering

Industrial Engineering

Mechanical Engineering, with options in:

- (a) General
- (b) Furniture Manufacturing
- (c) Heating and Air Conditioning
- (d) Metals

All of the curricula contain courses of general educational value which prepare students for the duties of citizenship in a democracy. However, the

curricula are primarily technical and practical, and designed to prepare young men for professional practice and for definite vocations as well as for leadership in the industrial advancement of the State.

The instruction is such as will foster the individual talent, imagination, and initiative of students, and instill in them ideals of accomplishment, service, and good citizenship, while assuring to them that scientific education and practical training which will prepare them for professional service and leadership in engineering and in industry. In this way the School of Engineering aids in the advancement of commerce and industry and furthers the development and economic utilization of the State's resources for the general welfare.

All the engineering curricula emphasizes thoroughness in the study of English and of the sciences—Mathematics, Physics, and Chemistry—with a thorough drill in the application of fundamental principles to engineering and industrial problems. Engineering is a profession, and the students come to realize that it is both honorable and learned, and that it offers exceptional opportunities for service.

The several engineering curricula have a common freshman year and differ only slightly in the sophomore year, in which years the students study English, Mathematics, Drawing, Shopwork, Physics, and Chemistry. In the junior and senior years the students are directed definitely to the professional aims in carefully considered and well-balanced curricula.

\* **Summer Work.**—At least six weeks of summer employment, approved by the Head of the Department in which the student is enrolled, preferably in the summer following the junior year, is a specific requirement for graduation in Engineering.

The purpose of this is to have every student, before graduation, acquire the valuable experience of actual work with responsibility and pay in the field of his vocation. Departmental advisers will aid students in getting summer employment.

\* **Inspection Trips.**—In order to familiarize himself with the practice of his profession, each senior in Engineering is required as a part of his curriculum to take the departmental inspection trips. None will be excused except for grave reasons.

These inspection trips are arranged by the Head of the Department in which the student takes his major work. The cost of such trips vary from \$25.00 to \$60.00 per student, depending on the time and distance traveled.

**Degrees.**—Six different types of degrees may be secured through the School of Engineering. These are:

1. **Bachelor of Science (B.S.).** This degree can be obtained only through completion of the curriculum in General Engineering. This is a course of study founded upon the fundamentals of engineering with no specialized courses but with liberal allowances for electives in the cultural courses. It is an earned undergraduate degree and can be obtained by four years of undergraduate work.

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\* Waived for the duration of the war.

2. Bachelor of a Specialized Branch of Engineering, for example, B.C.E. Bachelor of Civil Engineering. This is an earned undergraduate degree which includes in the last two years some specialized courses in the particular branch of engineering in which the student is studying. This course is planned for four years of study; but due to the fact that it is very difficult, only the very best prepared and most diligent students can successfully complete it in the time allotted.

3. Master of Science (M.S.) in a specialized branch of engineering. This is an earned graduate degree which can be obtained only after the Bachelor's degree. It requires at least one year of graduate work, a reading knowledge of at least one foreign language, and a thesis showing ability to pursue independent research. The core of graduate courses taken must emphasize a scientific objective. Further information concerning the requirements for this degree may be obtained by addressing Dr. Z. P. Metcalf, Director of Graduate Studies, State College, Raleigh, N. C.

4. Master of a Specialized Branch of Engineering, for example, (M.C.E.) Master of Civil Engineering. This is an earned graduate degree which can be obtained only after the specialized Bachelor's degree and requires one year of graduate work which emphasizes the technical and specialized professional engineering courses, and a thesis along professional engineering lines indicating ability to carry on independent professional investigations. For further information concerning this degree address Dr. Z. P. Metcalf, Director of Graduate Studies, State College, Raleigh, N. C.

5. The Professional degree, for example, Architectural Engineer, Ceramic Engineer, Chemical Engineer, Civil Engineer, Electrical Engineer, Mechanical Engineer.

This is an earned degree which is conferred only upon the graduates of some branch of the University of North Carolina, after five years of professional engineering practice in responsible charge of important work, the acceptance of a thesis on a subject related to the professional engineering practice in which the applicant is engaged, and the passing of an examination upon the candidate's professional experience. For further information concerning this degree address Dr. Z. P. Metcalf, Director of Graduate Studies, State College, Raleigh, N. C.

6. The Honorary Degree of Doctor of Engineering (D.Eng.). This degree is purely an honorary degree conferred upon men of extraordinarily high professional engineering attainments who are graduates of one of the branches of the University of North Carolina, or upon professional engineers who have rendered distinguished services to the State of North Carolina.

**Graduation.**—The requirements for graduation in a specialized branch of Engineering are the satisfactory completion of all the courses in one of the prescribed curricula (see tabulation of curricula on the pages following), a total of not less than 240 term credits, with not less than 240 honor points.

Of the minimum of 240 term credits required for graduation in Engineering, 117 are common to all curricula: 30 term credits in Mathematics, 18

in Language, 9 in Economics, 12 in Chemistry, 12 in Physics, 9 in Mechanics, 9 in Drawing and Descriptive Geometry, 12 in Military Training, and 6 in Hygiene and Physical Education.

Each of the curricula permits election of at least 18 term credits and contains not more than 72 special technical term credits.

**Graduates in Liberal Arts.**—An increasing number of graduates of liberal-arts colleges and universities are seeking an engineering degree. The policy of the School of Engineering is to allow as liberal an arrangement of courses as possible to suit the individual student's needs so that the degree in engineering may be obtained in the briefest time possible. However, the liberal-arts courses are distinctly different from those offered in an engineering school even when they have the same name and deal with the same subject matter. Students are therefore advised that the best economy of their time and money will be attained if they enroll at the beginning of their college careers as freshmen in an engineering curriculum.

A graduate with an A.B. degree will normally require two years additional work to obtain a Bachelor's degree in engineering.

A graduate with a B.S. degree may obtain a degree in engineering with from one to two years of additional study. A final decision in each case can be made only after an evaluation of the transcript of the student's record in the college from which he has received his degree.

**Short Courses; Institutes.**—The School of Engineering coöperates with the College Extension Division in offering short courses and institutes for adults and graduate engineers. These courses vary in length from one day to one week; each year the courses covered are different and vary according to the public demand. The faculty of the School of Engineering usually furnishes a large portion of the instruction offered in these courses, which in the past have been for Electrical Metermen, Gas Plant Operators, Water-works Operators, Heating and Plumbing Contractors, Surveyors and Engineers. These short courses are usually held in Raleigh because the School of Engineering has unusual laboratory and classroom facilities which offer a decided advantage to those who desire to "brush up" on their specialty and bring themselves abreast of the times by attending such short courses. For information concerning any short course, address inquiry to Mr. Edward Ruggles, Director, Extension Division, State College, Raleigh.

## ENGINEERING WAR TRAINING

Since July, 1940, the School of Engineering has been coöperating with the Office of Education of the Federal Government in offering Engineering War Training courses on a college level, designed to train men and women as rapidly as possible to enter the war industries. The following courses have been offered: Aircraft Inspection; Chemical Testing and Inspection; Diesel Engineering; Engineering Drawing; Experimental Electronics; Instrument Men and Topographers; Materials Inspection and Testing; Production Engineering; Production Supervision; Spectroscopy in Industry; Architectural Drafting; Radio Communication; Power System Calculation; Indus-

trial Safety Engineering; Fabric Testing and Inspection; Electrical Distribution. Those who desire further information concerning these courses, please address their inquiries to: Edward W. Ruggles, Director, College Extension Division, N. C. State College, Raleigh, North Carolina. While college credit may not be earned by taking these courses, they do train men and women for specific tasks in which the salaries are attractive. Normally there is no cost to the student except room and board while attending. The average length of these courses is from ten to twelve weeks.

The School of Engineering has also coöperated during the past year with the U. S. Office of Education through the State Department of Public Instruction, Division of Vocational Education, to offer courses in such vocational fields as acetylene and electric welding, aircraft sheet metal, and machine shop practice.

**Admission: Advanced Standing.**—Regulations for admission and advanced standing are stated under Information for Applicants.

### SERVICE DEPARTMENTS

An explanation of the purposes, and a listing of the personnel engaged in the three Service Departments in the School of Engineering follow:

### ENGINEERING MECHANICS

Professor G. Wallace Smith, Head of the Department

Professor N. W. Conner; Associate Professor A. Mitchell;

Assistant Professor C. E. Feltner\*

Instructors J. T. Massey,\* J. N. Farlow\*

The Department of Engineering Mechanics, which is housed in the Civil Engineering Building, teaches and administers the courses in theoretical and applied mechanics, strength of materials, and fluid mechanics. These courses have been grouped under an independent Department, which is the custom in most large engineering schools, for two reasons: first, to economize by preventing duplications and overlapping; second, because the mechanics courses are basic, required courses in all the engineering curricula, and here all engineering students meet on an equal footing. The best and most uniform results are thus obtained when such courses are taught in a Department completely separated from the bias of any particular type of specialization.

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\* On leave to U. S. Army.

**THE DEPARTMENT OF MATHEMATICS**

Professor H. A. Fisher, Head of the Department

Professors H. P. Williams, C. G. Mumford; Associate Professors J. M. Clarkson, J. W. Cell,\*\* R. C. Bullock, J. Levine,\* L. S. Winton,\* H. V. Park; Assistant Professors H. M. Nahikian,\* Robert Hooke, C. F. Strobel, W. P. Seagraves; Instructor H. C. Cooke.

Mathematics is one of the basic sciences in Engineering. At State College the large and competent Mathematics Department not only teaches the subject as a science but gives also a large amount of drill and practice to the students so that, upon completion of the courses, the students not only know the subject matter but are skilled and rapid in its use when applied to the problems of technology.

**THE PHYSICS DEPARTMENT**

Professor C. M. Heck, Head of the Department

Professor J. B. Derieux; Associate Professors J. S. Meares, F. W. Lancaster; Assistant Professors J. I. Hopkins, R. F. Stainback,\* E. J. Brown; Instructors G. W. Bartlett,\* G. W. Charles,\*\* J. T. Lynn.

Physics is another of the basic sciences upon which Engineering and Agriculture are founded.

**Facilities.**—The Department of Physics occupies the northern half of Daniels Hall—three floors, with six laboratories and six lecture rooms. The basement is devoted to research laboratories, shops, dark rooms, battery room, and power center. The two floors above comprise laboratories, lecture rooms, offices, and apparatus rooms.

**Equipment.**—The Department is equipped with laboratory apparatus in a sufficient number of sets to permit all students in a laboratory to work during the same period on the same experiment. All lectures are demonstrated with a large assortment of equipment and apparatus collected through many years.

On the roof of the building is located the astronomical observatory and the radio-research laboratory. The five-inch telescope is equatorially mounted and driven by clock work.

The Department is equipped for research and engineering students desirous of using Physics as a minor in their work for an advanced degree may use these facilities.

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\* On military leave.  
\*\* On leave.

**THE ENGINEERING EXPERIMENT STATION**

Associate Professor R. E. Stiemke,\* Assistant Director

Room 112, Civil Engineering Building, State College Station, Raleigh.

**Establishment.**—The Engineering Experiment Station of State College was established in 1923, as provided by the General Assembly of that year. It is an integral part of the School of Engineering, and is engaged in an organized program of research consisting of individual projects carefully defined and approved, which are carried on by engineering teachers. The Station fits uniquely into the program of instruction, research, and extension of State College.

**Purpose.**—The efforts of the Engineering Experiment Station are directed along the following lines:

- (a) The investigation of resources and processes, through experimentation and tests, with the object of opening and developing wider fields for the use of the natural resources of the State.
- (b) Coöperation with industrial organizations in the solution of technical problems, which require such facilities and equipment as are available at State College.
- (c) The coördination of research undertaken by the Engineering School.
- (d) The publication of the results of experimental and research projects made by the Engineering Experiment Station and the several Engineering Departments of State College.

**Publications.**—The Experiment Station has, since its organization, co-operated with various organizations and industries in the State in the investigation of problems peculiar to North Carolina. The results of such investigations have, from time to time, been issued in the form of Bulletins. The following is at present a complete list of the publications of the Station:

Bulletin No. 1. "County Roads: Organization, Construction and Maintenance," by Harry Tucker, James Fontaine, and L. D. Bell.

Bulletin No. 2. "Tests of Face and Common Brick Manufactured in North Carolina," by A. F. Greaves-Walker and James Fontaine.

Bulletin No. 3. "Poles from North Carolina Forests," by Wm. Hand Browne, Jr., and James Fontaine.

Bulletin No. 4. "Motor Vehicle Accidents in North Carolina," by Harry Tucker.

Bulletin No. 5. "Occurrence and Physical Properties of North Carolina Marble," by Jasper L. Stuckey and James Fontaine. Price twenty cents.

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\* On military leave.

- Bulletin No. 6. "The Occurrence, Properties, and Uses of the Commercial Clays and Shales of North Carolina," by A. F. Greaves-Walker, N. H. Stolte, and W. L. Fabianic. Price fifty cents.
- Bulletin No. 7. "Highway Grades and Motor Vehicle Costs," by Howard Burton Shaw and James Fontaine. Price twenty cents.
- Bulletin No. 8. "Financial Management for Highways," by Marc C. Leager. Price one dollar.
- Bulletin No. 9. "Highway Accidents in North Carolina and Guides to Safety," by Harry Tucker. Price fifty cents.
- Bulletin No. 10. "North Carolina Building Code," by the North Carolina Building Code Council. Price one dollar.
- Bulletin No. 11. "The Production of an Insulating Brick Using North Carolina Shales," by A. F. Greaves-Walker, W. C. Cole, Jr., and S. C. Davis. Price twenty cents.
- Bulletin No. 12. "The Development of Pyrophyllite Refractories and Refractory Cements," by A. F. Greaves-Walker, C. W. Owens, Jr., T. L. Hurst, and R. L. Stone. Price fifty cents.
- Bulletin No. 13. "The Preparation of Concrete Using North Carolina Materials," by Harry Tucker and W. G. Geile.
- Bulletin No. 14. "The Location and Distribution of the Ceramic Mineral Deposits of North Carolina," by A. F. Greaves-Walker and S. G. Riggs, Jr. Price twenty-five cents.
- Bulletin No. 15. "A Study of Courses in Technical Writing," by A. M. Fountain. Price one dollar.
- Bulletin No. 16. "The Production of Unfired and Fired Forsterite Refractories from North Carolina Dunites," by A. F. Greaves-Walker and R. L. Stone. Price fifty cents.
- Bulletin No. 17. "Papers Presented at School for Street Superintendents, 1939," compiled by Harry Tucker.
- Bulletin No. 18. "Net Revenue Method of Comparing Distribution Transformers," by R. R. Brown.
- Bulletin No. 19. "The Origin, Mineralogy and Distribution of the Refractory Clays of the United States," by A. F. Greaves-Walker.
- Bulletin No. 20. "Papers Presented at School for Street Superintendents, 1940," compiled by Harry Tucker.
- Bulletin No. 21. "Drafting Room Practices," by T. C. Brown and P. E. Moose. Price twenty-five cents.
- Bulletin No. 22. "The Development of an Unfired Pyrophyllite Refractory," by A. F. Greaves-Walker and J. J. Amero. Price fifty cents.

Bulletin No. 23. "The Suitability of North Carolina Shales and Clays for Mortar Mixes," by A. F. Greaves-Walker and W. A. Lambertson. Price twenty-five cents.

Bulletin No. 24. "The Development of Light Weight Concretes from North Carolina Vermiculites," by William A. Scholes, A. F. Greaves-Walker, E. R. Todd, and D. F. Cox. Price fifty cents.

Bulletin No. 25. "Ceramic Dielectric and Insulator Materials for Radio and Radar Instruments," by R. L. Stone. Price fifty cents.

Bulletin No. 26. "Suitability of North Carolina Trees for Chemical Conversion Products and for Certain Other Uses," by E. E. Randolph. Price fifty cents.

**Current Activities.**—The Experiment Station is now assisting in the following investigations that are being conducted by the several Departments of the Engineering School:

1. In coöperation with the Department of Chemistry of State College and the Medical School of Duke University: A study of night blindness in relation to automobile accidents.
2. In coöperation with the United States Geological Survey: The geology of Wake County, North Carolina.
3. In coöperation with the North Carolina State Highway and Public Works Commission: Investigation of steel-beam bridges with concrete floors.
4. In coöperation with the North Carolina State Board of Health: The efficiency of small, sewage-treatment plants.
5. In coöperation with the Rural Electrification Administration: The effects of varying voltages on single-phase motors.
6. In coöperation with the Testing Division of the North Carolina Department of Revenue: The testing of motor fuels.
7. In coöperation with the City of Raleigh, North Carolina: An investigation of the design and capacity of gutter intakes.
8. A Photoelectric Integrator for Load-Temperature Studies.
9. The Development of Improved Low-Loss Radio and Radar Insulators.
10. Determination of the Maximum Safe Drying Rates of Clays and the Subsequent Control of Their Drying.
11. Study of Foam Formation and Prevention in Boiler Water.
12. Corrosion of Gas Jets and Formation of Deposits on Burners as Related to the Composition of Commercial Gas.
13. Determination of the Effects of Scale and Water Temperature on the Water Quenching of Steel Castings.

## THE N. C. STATE COOPERATIVE PLAN OF ENGINEERING EDUCATION

\*Frank F. Groseclose, Director; T. C. Brown, Acting Director

The N. C. State Coöperative Plan of Engineering Education was started at North Carolina State College in the spring of 1940. It offers candidates for engineering degrees the combination of practical experience in industry and theoretical instruction in the required technical courses. During the first year 40 students coöperated with 12 industries in three states.

The N. C. State Coöperative Plan divides the coöperative students in two sections. One section attends college the Fall and Spring terms each year, then works with a coöperating industry the Winter and Summer terms. The alternate section attends college the Winter and Summer terms and works in industry the Fall and Spring terms. For the average student this will mean one additional year or a total of five years for graduation in engineering. The student's participation in this five-year program is as follows: The full Freshman year is spent in residence at the college. The regular Sophomore and Junior years are divided into alternate periods of college attendance and work of three months duration each. The student spends his entire Senior year in residence at college.

During the Freshman year, students following the Coöperative Plan will pursue the same schedule of full time attendance in the Basic Division as students of the regular four-year curricula. The coöperative students normally take exactly the same academic work as non-coöperative students. Liberal substitutions may be allowed in preparing students for specific jobs in industry.

In order to provide for worthy persons now employed in industry, whose employers are willing to coöperate, arrangements are available which allow these men to enter as Freshmen in the Basic Division, provided, of course, they meet the entrance requirements of N. C. State College. For those in industry who have already completed some college work, a transcript of college credits must be submitted to the Registration Office for evaluation. Such persons would complete at State College only the necessary additional credits required for an engineering degree. Those already employed in industry may be recommended to the college by their employers as suitable persons for pursuing or continuing college grade work.

Only Freshmen who can meet the scholastic requirement of a better than "C" average are eligible for participation in the Coöperative Plan. The maintenance of this policy avoids college recommendation to the industry of a student who would have to be suspended on account of poor scholarship, with consequent interruption of his employment with industry.

Employment under the coöperative plan is not guaranteed, but every effort is made to place all worthy students whose scholarship, character, and abilities indicate that they will be successful in pursuing the coöperative plan.

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\* On leave to U. S. Army.

Women are becoming more and more in demand by various industries, and the coöperative plan offers them the advantages of a technical education combined with actual industrial experience.

Placement in industry is generally made by furnishing to the industry concerned a few applications of the students selected by the Director as most likely to fit the particular needs of the industry. In some cases the industries have authorized the Director to make assignment of students to them based on specification submitted by the particular industry.

College fees, under the coöperative plan, are the same as those listed in the catalog for other students, with the exception that payments are arranged on a three months basis rather than twice a year.

Applications for admittance to the coöperative plan may be made at any time, preferably before April 1 of the Freshman year.

Those interested should communicate directly with the Acting-Director, N. C. State Coöperative Plan of Engineering Education, Box 5518, State College Station, Raleigh, N. C.

### CURRICULA OFFERED IN THE SCHOOL OF ENGINEERING

Each of the following curricula is not only well balanced, but offers a liberal course of study in a technical and professional field. Each conforms to what is regarded by engineering educators as the best modern practice.

Also offered in the School of Engineering is a curriculum leading to the Bachelor of Science degree in Engineering (see page 114). This curriculum has no specialization and requires but 238 term credits with at least 238 honor points. It is recommended to those who desire a broad general training in the basic principles of Engineering.

### FRESHMAN YEAR of ALL CURRICULA in ENGINEERING

COURSES	CREDITS		
	First Term	Second Term	Third Term
Algebra, Trigonometry, Analytical Geometry, Math. 101, 102, 103	6	6	6
Composition, Eng. 101, 102, 103	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103	4	4	4
Engineering Drawing II, M.E. 105, 106	3	3	0
Descriptive Geometry, M.E. 107	0	0	3
Military Science I, MIL 101, 102, 103, or World History, Hist. 104	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103	1	1	1
	19	19	19

Summer requirement following the freshman year in Aeronautical, Architectural, Ceramic, Electrical, General, and Mechanical Engineering: Surveying, C.E. s200, 3 credits.

### \*Citizenship Requirement for All Curricula in Engineering

In order that every graduate of the School of Engineering may have a working knowledge of the fundamentals of American Government, all students in the School of Engineering are required to take prior to the end of their sophomore year a citizenship test, and in the event a student fails to pass this comprehensive examination, he will be required to take

\* Waived for the duration of the war.

American Government (Political Science 211) 3 or 3 or 3. Students may elect to take the course in lieu of the examination, and students taking the course will be permitted to apply the credit earned in partial satisfaction of their social science electives. A student must pass the comprehensive examination or the course in American Government before he can graduate from the School of Engineering.

### AERONAUTICAL ENGINEERING

W. G. Friedrich, Visiting Professor of Industry; Associate Professors L. R. Parkinson,\* R. F. Rautenstrauch,\*\* Instructor R. W. Truitt.\*

#### Building and Equipment—

The Department of Aeronautical Engineering has a new building centrally located on the campus. It contains the offices of the aeronautical engineering faculty and the aeronautical laboratory. The Aeronautical Engineering Department also operates the University-owned Horace Williams airport at Chapel Hill. This airport, one of the largest in the south and the finest college airport in the country is capable of handling aircraft of any size. The University owns and maintains a fleet of airplanes for the purpose of training prospective pilots for both military and commercial needs. Licensed personnel maintain the equipment in an airworthy condition.

The Aeronautical Laboratory provides for the testing of component parts of aircraft. The latest machines and instruments are available for use in this connection. A Luscombe monoplane of all metal construction, completely equipped with instruments, is used for purposes of study and flight testing.

#### Curriculum—

Since the trend of airplane design changes quite rapidly, no attempt is made to produce specialists in any phase of aeronautical engineering. The course of study is intended to give the student a well rounded knowledge of fundamentals. Upon graduation most students find positions in aircraft industry or the aviation services where they may receive further training of more specialized nature. Thus a student may prepare himself for any one of the many ground and flying positions available in the aviation industry today. In view of the present war requirements more time is being devoted to aircraft production subjects. Courses in Air Transportation are normally offered.

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\* On military leave.

\*\* On leave.

## CURRICULUM IN AERONAUTICAL ENGINEERING

For the Freshman Year, refer to page 106.

Summer requirement following the freshman year: Surveying, C.E. s200, 3 credits.

## Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303 . . . . .	4	4	4
†Business English, Pub. Speaking, Eng. 211, 231, and Elective English . . . . .	3	3	3
Physics for Engineers, Phys. 201, 202, 203 . . . . .	4	4	4
Mechanical Drawing, M.E. 211, 212, 213 . . . . .	2	2	2
Shopwork, M.E. 121, 122, 123 . . . . .	1	1	1
Engineering Mechanics, E.M. 311 . . . . .	0	0	3
Metallurgy, M.E. 322, 323 . . . . .	3	3	0
*Military Science, Mil. 201, 202, 203 . . . . .	2	2	2
Physical Education, P.E. 201, 202, 203 . . . . .	1	1	1
	—	—	—
	20	20	20

## Junior Year

Engineering Mechanics, E.M. 312, 313 . . . . .	3	3	0
Thermo., M.E. 307, 308, 309 . . . . .	3	3	3
Thermo. Lab., M.E. 313, 314, 315 . . . . .	1	1	1
Elem. Mechanism, M.E. 215, 216, 217 . . . . .	1	1	1
General Aeronautics, Aero. E. 300 . . . . .	0	3	0
Elem. Aeronautics, Aero. E. 310 . . . . .	0	0	3
Materials of Construction, C.E. 321 . . . . .	3	0	0
Str. of Materials, E.M. 321, 322 . . . . .	0	3	3
Fluid Mechanics, E.M. 330 . . . . .	0	0	3
Tech. Writing, Eng. 321 . . . . .	0	0	3
Business Law, Econ. 307 . . . . .	3	0	0
Elements of E.E., E.E. 320, 321 . . . . .	3	3	0
**Electives . . . . .	3	3	3
	—	—	—
	20	20	20

## Senior Year

General Economics, Econ. 201, 202, 203 . . . . .	3	3	3
Internal Comb. Engines, M.E. 421, 422, 423 . . . . .	3	3	3
Airplane Design, Aero. E. 421, 422, 423 . . . . .	3	3	3
Aerodynamics, Aero. E. 431, 432, 433 . . . . .	3	3	3
Aero. Lab., Aero. E. 441, 442, 443 . . . . .	1	1	1
Aircraft Engines, Aero. E. 451, 452 . . . . .	0	3	3
Aircraft Manufacturing, Aero. E. 411, 412 . . . . .	3	3	0
**Electives . . . . .	3	3	3
	—	—	—
	19	22	19

† Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

\* Or 6 credits in one or two of the following departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

**ARCHITECTURE AND ARCHITECTURAL ENGINEERING**

Professor Ross Shumaker, Head of Department

Professor J. D. Paulson

Assistant Professors F. Carter Williams\*, W. L. Baumgarten,  
James H. Grady

The courses in Architecture and Architectural Engineering have been arranged after careful study of the best curricula offered by the leading educational institutions in the United States. These studies and many years of practical experience on the part of the faculty—both in the profession and in teaching, enable this Department to offer two allied courses of merit, proved by the very high proportion of graduates of this Department who successfully follow the profession of architect.

The first three years of study in Architecture and in Architectural Engineering are very similar—so arranged that a student may transfer from one curriculum to the other until the end of the junior year—with a minimum loss of credits. After the third year, however, there is a wide divergence in the courses.

Architecture is one of the most valuable and constructive professions in modern civilization. While an art, it must be firmly rooted in science; and the greater the project, the more positively this is true. Consequently, a student who is ambitious to be a great architect must master the artistic scope of architecture and also such science as is pertinent. To compress such a course into four years would necessarily eliminate some essential studies or reduce the content of all. Therefore the curriculum in Architecture is presented as a five-year course of study.

Architectural Engineering is designed to prepare students for the pursuit of engineering as allied with architecture. Modern architecture has so many engineering aspects as in construction, fabrication and use of materials, provision of conveniences, that a student may well plan to specialize in some one of these fields. This four-year course provides a thorough training in the theoretical engineering of architecture and a sufficient knowledge of architecture as an art to enable the graduate to pursue any specialized branch he may select. Also it is possible for him to continue in the field of architecture and eventually obtain registration as a licensed architect.

**Equipment.**—The Department of Architecture and Architectural Engineering occupies the third floor of Daniels Hall, an excellent location providing adequate space in well-lighted and comfortable rooms. Large drawing rooms, library, lecture rooms, photographic dark room, and offices, overlooking the entire State College Campus, constitute an ideal physical layout for the Department. Drawing tables, stools, lockers, and essential furniture are all provided.

**Alumni.**—Graduates of this department have little difficulty in normal times in finding employment and experience such that in a few years they can obtain registration as licensed architects. Many graduates have been conspicuously successful, and it is worthy of note that a very large proportion remain in the State of North Carolina or adjacent territory.

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\* On military leave.

## CURRICULUM IN ARCHITECTURAL ENGINEERING

For the Freshman Year, refer to page 106.

Surveying, C.E. 8200, 3 credits, is required in the summer immediately following the freshman year.

## Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303 . . . . .	4	4	4
*Business English, Public Speaking, Eng. 211, 231, and Elective English . . . . .	3	3	3
Physics for Engineers, Phys. 201, 202, 203 . . . . .	4	4	4
Engineering Mechanics, E.M. 311, 312 . . . . .	0	3	3
Elements of Architecture I, II, III, Arch. 201, 202, 203 . . . . .	3	3	3
Shades and Shadows, Arch. 205 . . . . .	2	0	0
Pencil Sketching, Arch. 100 . . . . .	1	1	1
Perspective Drawing, Arch. 206 . . . . .	1	0	0
Military Science II, Mil. 201, 202, 203 (or elective†) . . . . .	2	2	2
Sport Activities, P.E. 201, 202, 203 . . . . .	1	1	1
Sophomore Year . . . . .	21	21	21

## Junior Year

Engineering Mechanics, E.M. 313 . . . . .	3	0	0
Strength of Materials, E.M. 321, 322 . . . . .	0	3	3
Materials Testing Laboratory, C.E. 322 . . . . .	0	1	0
Materials of Construction, O.E. 321 . . . . .	0	0	3
Sanitary and Mech. Equipment of Buildings, C.E. 365, 366 . . . . .	3	3	0
General Economics, Econ. 201, 202, 203 . . . . .	3	3	8
Freehand Drawing 1, 2, 3, Arch. 101, 102, 103 . . . . .	2	2	2
Intermediate Design B-1, B-2, B-3, Arch. 301, 302, 303 . . . . .	3	3	8
History of Architecture 1, 2, 3, Arch. 321, 322, 323 . . . . .	3	3	8
**Electives . . . . .	8	3	3
Junior Year . . . . .	20	21	20
Summer Requirements: Six Weeks Industrial Employment.			

## Senior Year

Reinforced Concrete, C.E. 421, 422 . . . . .	3	3	0
Graphic Statics, C.E. 423, 424, 425 . . . . .	1	1	1
Theory of Structures, C.E. 431a, 432a . . . . .	3	3	0
Photographic Practice, Arch. 304 . . . . .	0	0	1
Specifications, Arch. 416 . . . . .	0	0	3
Building Materials I, Arch. 409 . . . . .	3	0	0
Electrical Equipment of Buildings, E.E. 343 . . . . .	0	0	8
Business Law, Econ. 307 . . . . .	3	0	0
Architectural Design, E-1, E-2, Arch. 351, 352 . . . . .	3	3	0
Architectural Office Practice, Arch. 411, 412 . . . . .	0	3	3
Architectural Estimates, Arch. 408 . . . . .	0	0	2
Structural Design, C.E. 426, 427 . . . . .	0	3	3
**Electives . . . . .	3	3	3
Senior Year . . . . .	19	19	19

Total credits required for completion of course: 241. Degree: Bachelor of Architectural Engineering.

All seniors will be required to go on the inspection trip as part of their curriculum.

\* Students who have been certified by the Department of English as proficient in English may substitute for the course listed French, M.L. 101.

† Or six credits in one or two of the following Departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

## CURRICULUM IN ARCHITECTURE

## Freshman or First Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Mathematics 101, 102, 103	6	6	6
Composition, Eng. 101, 102, 103	3	3	3
French, or Modern Language, M.L. 101, 102, 201, or Equiv.	3	3	3
Pencil Sketching, Arch. 100	1	1	1
World History, Hist. 104	2	2	2
Architectural Drawing, Arch. 107 (or M.E. Equivalent)	3	3	0
Descriptive Geometry, M.E. 107	0	0	3
Military Science I, Mil. 101, 102, 103 (or elective)	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103	1	1	1
Freshman or First Year	21	21	21
Summer Requirements: Surveying, C.E. s200, 3 credits.			

## Sophomore or Second Year

Calculus I, II, III, Math. 201, 202, 303	4	4	4
Background for Modern Thought (or Elective)	3	3	3
Physics for Engineers, Phys. 201, 202	4	4	0
Shades and Shadows, Arch. 205	2	0	0
Engineering Mechanics, E.M. 301, 302	0	3	3
Elements of Architecture I, II, III, Arch. 201, 202, 203	3	3	2
History of Sculpture and Mural Decoration, Arch. 325	0	0	2
Working Drawings, Arch. 305	0	0	0
Perspective Drawing, Arch. 206	1	0	0
Military Science II, Mil. 201, 202, 203 (or elective)	2	2	2
Sport Activities, P.E. 201, 202, 203	1	1	1
Sophomore or Second Year	20	20	20

## Junior or Third Year

Business English, Pub. Speaking, Eng. 211, 231, and Elective English (or M.L.)	3	3	3
Strength of Materials, E.M. 321, 322	0	3	3
Materials Testing Laboratory, C.E. 322	0	1	0
Materials of Construction, C.E. 321	3	0	0
Sanitary and Mech. Equip. of Buildings, C.E. 364	3	0	0
Freehand Drawing 1, 2, 3, Arch. 101, 102, 103	2	2	2
Architectural Office Practice, Arch. 411, 412	0	3	3
Intermediate Design B-1, B-2, B-3, Arch. 301, 302, 303	3	3	3
History of Architecture 1, 2, 3, Arch. 321, 322, 323	3	3	3
**Electives	3	3	3
Junior or Third Year	20	21	20
Summer Requirements: Six Weeks Industrial Employment			

## Senior or Fourth Year

General Economics, Econ. 201, 202, 203	3	3	3
Reinforced Concrete, C.E. 421, 422	3	3	0
Graphic Statics, C.E. 423, 424, 425	1	1	1
Electrical Equipment of Buildings, E.E. 343	0	0	3
Architectural Design B-4, B-5, B-6, Arch. 353, 354, 355	6	6	6
History of Architecture 4, Arch. 421	0	3	0
Building Materials I, Arch. 409	3	0	0
Professional Practice, Arch. 414	0	0	1
Clay Modeling, Arch. 114	1	1	1
Photographic Practice, Arch. 304	0	0	1
**Electives	3	3	3
Senior or Fourth Year	20	20	19

† Or six credits in one or two of the following Departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

## Professional or Fifth Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Business Law, Econ. 307 . . . . .	3	0	0
Specifications, Arch. 416 . . . . .	0	0	3
Theory of Structures, C.E. 431a, 432a . . . . .	3	3	0
Architectural Design A-1, A-2, A-3, Arch. 401, 402, 403 . . . . .	6	6	6
Freehand Drawing 4, 5, 6, Arch. 211, 212, 213 . . . . .	3	3	3
Architectural Composition, Arch. 407 . . . . .	2	0	0
City Planning, Arch. 415 . . . . .	0	2	0
Architectural Estimates, Arch. 408 . . . . .	0	0	2
**Electives . . . . .	8	6	6
	<hr/>	<hr/>	<hr/>
Fifth Year	20	20	20

Total Credits: 306. Completion of the course to be recognized by granting the degree of Bachelor of Architecture.

## CERAMIC ENGINEERING

Professor A. F. Greaves-Walker\*, Head of the Department; Associate Professor R. L. Stone, Acting Head of the Department.

The Department of Ceramic Engineering occupies its own building, which contains classrooms, a design room, a chemical laboratory, an equipment laboratory, and a kiln laboratory.

The Equipment Laboratory contains an adequate variety of machines for preparing and processing ceramic bodies of all kinds and making ceramic products on a laboratory scale. It also contains the necessary equipment for carrying on ceramic research, and the testing of materials and products.

The Kiln Laboratory contains twelve kilns and furnaces of different types, which provide for the firing or testing of all ceramic materials and products.

Ceramic Engineering includes those phases of engineering which have to do with the study of the nonmetallic, inorganic minerals, except fuels and ores as such, and the manufacture of products therefrom. The nonmetallic minerals compose over 90 per cent of the earth's surface, and the industries based on them rank above the automobile, and the iron and steel industries, in value of product. Principal among these products are those made of clay and associated minerals, such as building brick, hollow tile, sewer pipe, refractories, wall and floor tile, tableware, pottery, electrical porcelain, chemical and sanitary stoneware, flat glass, chemical and table glassware, enameled iron and steel, portland and hydraulic cements, and limes.

North Carolina has enormous deposits of shale, clay, kaolin, feldspar, sand, limestone, and other ceramic minerals, equal in quality to any others in the United States; with the introduction of modern processes and methods will produce in future quantities of ceramic products and adequately develop its ceramic industries.

\* On leave to the WPB.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

The demand for ceramic engineers has far exceeded the supply for a number of years past, there being fewer than 100 ceramic engineers graduated in the United States each year. It is with the idea of supplying this demand and developing the latent resources of North Carolina that a four-year curriculum in Ceramic Engineering, leading to the degree of Bachelor of Ceramic Engineering, is offered.

The instruction in Ceramic Engineering is enriched by the intensive investigation of ceramic resources and manufactures constantly under way in connection with the Engineering Experiment Station. Students will have the great advantage of these investigations along with other instruction.

Courses in advanced subjects for graduate students are offered in Advanced Refractories and Furnaces, Industrial Adaptability of Clays, Designing of Ceramic Equipment and Plants, Advanced Silicate Technology, Glass Technology, and Ceramic Research.

The curriculum in Ceramic Engineering, which has been accredited by the Engineers Council for Professional Development, contains fundamental courses, and courses in Ceramic, Geological, Civil, Electrical, and Mechanical Engineering, as well as in Economics, to provide for the general training in engineering with the particular study of Ceramic Engineering. The Ceramic Engineering courses consist of the theoretical and practical study of the mining, manufacturing, and testing of ceramic materials and products as well as the design of ceramic equipment and plants.

Graduates in Ceramic Engineering are employed in the ceramic industries as plant executives, research engineers, plant-control engineers, sales engineers, product-control engineers, plant designers and constructors, equipment manufacturers, consulting engineers, and ceramic chemists and technologists. Graduates of the Department at State College, which ranks fourth in registration in the United States, are successfully holding positions in all of these branches.

### CURRICULUM IN CERAMIC ENGINEERING

For the Freshman Year, refer to page 106.

Surveying, C.E. 8200, 3 credits, is required in the summer immediately following the freshman year.

#### Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303 .....	4	4	4
Qualitative Analysis, Chem. 211 .....	4	0	0
Quantitative Analysis, Chem. 212 .....	0	4	0
Physics for Engineers, Phys. 201, 202, 203 .....	4	4	4
Engineering Geology, Geol. 220 .....	3	0	0
Mineralogy, Geol. 230 .....	0	0	3
*Business English, Public Speaking, Eng. 211, 231, and Elective English .....	3	3	3
Ceramic Materials, Cer. E. 202 .....	0	3	0
Ceramic and Mining Processes, Cer. E. 203 .....	0	0	3
†Military Science II, Mil. 201, 202, 203 .....	2	2	2
Sport Activities, P.E. 201, 202, 203 .....	1	1	1
	—	21	20

\* Students who have been certified by the Department of English as proficient in English may substitute for the courses listed Elementary German, M.L. 102.

† Or six credits in one or two of the following Departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Engineering Mechanics, E.M. 311, 312, 313 . . . . .	3	3	3
Strength of Materials, E.M. 321 . . . . .	0	0	3
General Economics, Econ. 201, 202, 203 . . . . .	3	3	3
Drying Fundamentals and Practice, Cer. E. 301 . . . . .	3	0	0
Firing Fundamentals and Practice, Cer. E. 302 . . . . .	0	3	0
Ceramic Calculations, Cer. E. 303 . . . . .	0	0	3
Ceramic Products, Cer. E. 305 . . . . .	0	0	3
Engineering Thermodynamics, M.E. 307, 308 . . . . .	3	3	0
Mechanical Engineering Laboratory I, M.E. 313, 314 . . . . .	1	1	0
Materials Testing Laboratory, C.E. 322 . . . . .	0	1	0
Thermal Mineralogy, Geol. 338 . . . . .	0	3	0
Physical Chemistry, Chem. 331 . . . . .	5	0	0
Business Law, Econ. 307 . . . . .	0	0	3
**Electives . . . . .	3	3	3
	<u>21</u>	<u>20</u>	<u>21</u>

Summer requirements: Six weeks industrial employment.

## Senior Year

Refractories, Cer. E. 405 . . . . .	0	0	3
Silicates, I and II, Cer. E. 403, 404 . . . . .	3	3	0
Ceramic Laboratory, Cer. E. 411, 412, 413 . . . . .	3	3	3
Ceramic Designing, Cer. E. 414, 415 . . . . .	0	4	4
Pyrometry, Cer. E. 401 . . . . .	1	0	0
Technical Writing I, Eng. 321 . . . . .	3	0	0
Elements of Electrical Engineering I, E.E. 320, 321 . . . . .	0	3	3
Strength of Materials, E.M. 322 . . . . .	3	0	0
Optical Mineralogy, Geol. 431, 432, 433 . . . . .	3	3	3
**Electives . . . . .	3	3	3
	<u>19</u>	<u>19</u>	<u>19</u>

All seniors are required to go on the inspection trip as part of their curriculum.

## CHEMICAL ENGINEERING

Professor E. E. Randolph, Head of the Department

Professors B. E. Lauer\*, T. C. Doody; Assistant Professors R. Bright,  
J. F. Seely†; Instructor R. L. Overcash.†

Facilities.—The laboratories of the Department of Chemical Engineering are in Winston Hall. They consist of a Unit Operations laboratory; an exhibit study room; Water and Engineering-Materials Laboratory; Electrochemical Engineering Laboratory; Fuel- and Gas-Technology Room; Experimental Rayon outfit; Destructive Distillation Installation; Dark Room for metallographic and micro-photographic study; the Graduate Research Laboratory; Unit-Processes Laboratory; Plant- and Equipment-Design Laboratory; Cellulose Laboratory.

The Chemical Engineering laboratories have suitable equipment, much of it specially designed, for the study of the main processes and plant prob-

† On leave.

\* On leave to U. S. Army.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

lems of the chemical engineering industries. They are supplied with direct and alternating current, gas, water, steam, compressed air, electric motors, generators, and storage batteries. They are equipped with precision and control instruments, such as refractometer, surface-tension apparatus, polariscope, potentiometer, microscopes, colorimeter, calorimeters, tint-photometer, thermocouples, and optical pyrometer. They are equipped also with filter presses, centrifuges, crushers, grinders and pulverizers, vacuum pan, stills, autoclave, jacketed kettle, gas, water, and electrical meters, equipment designed and built, such as double-effect evaporators, heat exchangers, flow-of-fluid experimental equipment for orifices, venturi meters, pitot tubes, weir, and gauges, column still, absorption tower, crystallizer, rotary, vacuum and tunnel driers, gas furnace, resistance and arc electric furnace, rotary vacuum filter, and humidifier. An experimental refinery and hydrogenation plant for vegetable and other oils has been installed. A complete permutit softening equipment forms a unit of an experimental water-purification and -treatment system. In addition the nearby industrial plants offer opportunity for study of plant operation and problems.

Recently added to the Department of Chemical Engineering is a valuable exhibit room, where products of many chemical engineering industries are exhibited and used for instruction. They are arranged in the form of flow sheets showing the various steps in manufacturing processes.

The Department Shop is supplied with machines and tools for building and repairing equipment.

**Curriculum.**—This curriculum provides thorough training in unit operations and unit processes, and in the methods of manufacturing industrial chemical products on a large scale. It includes basic courses in Chemistry, Physics, Mathematics, and fundamental Engineering as a background for the professional Chemical Engineering training of this Department, so that the graduate is prepared to enter any field of applied chemical work as a junior engineer.

The Chemical Engineer is expected to determine the process, the material, the design, and the economic capacity of the equipment needed. Efficient production requires exact control in every stage of the process. He must devise efficient and economical methods, discover sources of loss and the remedy, recover by-products, convert waste products, and make industrial calculations of input, output, efficiency, quality, and cost.

North Carolina is a center of chemical industries in the South, with an annual output estimated at approximately one-fourth billion dollars. Some of the largest chemical industries of the country are located in this State, manufacturing such products as paper, fertilizers, vegetable oils, food products, leather, bromine, aluminum, metallurgical products, paints and varnishes. Such industries require properly trained Chemical Engineers. Chemical Engineering offers therefore inviting opportunities to render distinct service to the welfare and comfort of the people.

Graduates find employment in such fields as control work and industrial research; as plant operators, superintendents of chemical industries, municipal engineers, engineers in the State and Federal health service, consulting chemical engineers, manufacturers of chemicals and of chemical equipment, chemical salesmen and representatives, developers of new chemical industries.

Ninety-three percent of the graduates of this Department are successfully engaged in Chemical Engineering work. Because chemical problems are intricate, and scientific chemical-control work in industries is required, salaries for Chemical Engineering graduates are inviting. Many graduates of this Department now hold very responsible positions.

The Department coöperates with the State Departments in their chemical problems. Facilities are available for graduate work, upon which emphasis is placed.

## CURRICULUM IN CHEMICAL ENGINEERING

For the Freshman Year, refer to page 106.

### Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303	4	4	4
*Business English, Public Speaking, Eng. 211, 231, and Elective English	3	3	3
Introduction to Chemical Engineering, Chem. E. 201, 202, 203	1	1	2
Physics for Engineers, Phys. 201, 202, 203	4	4	4
Qualitative Analysis, Chem. 211	4	0	0
Quantitative Analysis, Chem. 212, 213	0	4	4
Shopwork, M.E. 122, 123	1	1	0
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P.E. 201, 202, 203	1	1	1
	20	20	20

### Junior Year

Engineering Mechanics, E.M. 311, 312, 313	3	3	3
Strength of Materials, E.M. 321	0	0	3
Organic Chemistry, Chem. 421, 422, 423	4	4	4
Chemical Engineering I, Chem. E. 311, 312, 313	3	3	3
Industrial Stoichiometry, Chem. E. 331	0	0	3
Chemical Engineering Laboratory I, Chem. E. 321, 322, 323	1	1	1
Physical Chemistry, Chem. 431, 432	4	4	0
Elements of Electrical Engineering I, E.E. 320, 321	3	3	0
Machine Shop I, M.E. 225, 226	1	1	0
Electives	3	3	3
	22	22	20

Summer requirements: Six weeks industrial employment.

\*\*Pilot Plant Practice—3 credits.

\* Students who have been certified by the Department of English as proficient in English may substitute for the courses listed German, M.L. 102, 103, 104, 203 or equivalent.

† Or six credits in one or two of the following Departments: Economics, Psychology, History, Modern Language, Sociology.

\*\* Elective Summer of 1946.

## Senior Year

COURSES	First Term	CREDITS	Second Term	Third Term
Principles of Chemical Engineering, Chem. E. 411, 412, 413	3	3	3	3
Water Treatment, Chem. E. 421	3	0	0	0
Chemistry of Engineering Materials, Chem. E. 422	0	3	0	0
Electrochemical Engineering, Chem. E. 423	0	0	0	3
Chemical Engineering Lab. and Design II, Chem. E. 431, 432, 433	2	2	0	2
Engineering Thermodynamics, M.E. 307, 308	3	3	0	0
Mineralogy, Geol. 230	0	0	3	3
General Economics, Econ. 201, 202, 203	3	3	0	0
Elementary Modern Physics, Phys. 407	3	0	0	0
Technical Writing I, Eng. 321	0	3	0	0
Business Law, Econ. 307	0	0	3	3
Electives	3	3	3	3
	20	20	20	20

## CIVIL ENGINEERING

Professor C. L. Mann, Head of the Department

Professor T. S. Johnson\*

Associate Professors C. R. Bramer, R. E. Stiemke\*

Assistant Professors C. M. Lambe, W. F. Babcock

Instructors E. W. Price, Jr., M. E. Ray

The Department of Civil Engineering is located in the Civil Engineering Building in which the offices, classrooms, laboratories, and instrument rooms were designed and built to provide suitable facilities for efficient teaching and laboratory demonstrations.

The equipment common to general civil engineering includes surveying instruments, transits, levels, plane tables, current meters, sextants, planimeters, calculating machines, blueprint apparatus, lantern slides, and moving-picture machine. Special equipment includes precise surveying instruments and such equipment as Beggs deformeter and other of this class.

The equipment in the Materials-Testing Laboratory, in the Cement- and Bituminous-Materials-Testing Laboratory, and in the Sanitary Laboratory, fully meets the present-day requirements for laboratory instruction.

The Soil Mechanics Laboratory has been furnished and equipped with the newest apparatus now used in laboratories engaged in the study of the action of soils relative to engineering problems dealing with structures, foundations, and highway subgrades.

Civil Engineering is the oldest and most general of all the branches of modern engineering; in fact, from it all of the others have developed. The usefulness of Civil Engineering is so well recognized that a student who does not have a strong predilection for some other special branch may be safely advised to study Civil Engineering.

The Civil Engineering curriculum in the School of Engineering has been accredited by the Engineers' Council for Professional Development. It is a

\* On leave.

well-balanced course of study, upon the completion of which the graduate is equipped to assume the duties of junior engineer in any of the following important fields: design, construction, operation, or testing of water-power developments, railroads, highways, water supplies, sewerage systems.

The Civil Engineering Department offers a student the choice of the following options:

General Civil

Construction and Building Materials

Sanitary

Transportation

The first two years of these curricula are the same. They begin to differentiate slightly in the junior year and more decidedly in the senior year; essentially, however, they are the same and are designed to develop in the student engineer a well-trained mind, one which reasons logically, accurately, quickly. This is accomplished by a thorough training in applied mathematics and physics, which is supplemented with practical work in the field, drafting rooms, and laboratories.

More men are practicing Civil Engineering in North Carolina than any other branch of engineering, and it is to train young men to serve under those already in the profession and subsequently to follow in their footsteps that the Civil Engineering curricula are offered.

**City Management.**—Students in Civil Engineering may by proper selection of their electives during the junior and senior years prepare themselves for work eventually leading to the position of City Manager.

## CONSTRUCTION & BUILDING MATERIALS ENGINEERING

Professor C. R. Bramer, Faculty Adviser

North Carolina's progress indicates great increase in building and general construction. Construction needs more and better-trained men to meet the immediate demands as well as to anticipate the increased demands of the future. The contractor, to be successful, must conduct his business systematically and economically. Therefore, he must learn not only general engineering technique, but also something of architecture and business methods and practices; he must delve further into construction and learn the principles involved, the methods, practices, and successful policies in use.

The contents of the curriculum in this option represent a thorough study of the needs of the industries operating in this field. This curriculum, combining construction with building materials, has been adopted to replace the former option in Construction Engineering given in the Department of Civil Engineering. It is believed that this will result in improving the training for men entering the field of contracting and construction and it also has the advantage of including subjects essential to those entering the building materials industry.

Combined into this curriculum are the fundamental courses in the Civil Engineering curriculum, courses in Architecture, courses dealing with business, and special courses covering construction and building materials in the junior and senior years.

The classroom work in this option is supplemented by frequent inspection trips to projects under construction; particular emphasis is placed upon estimating, modern methods, and management of operations.

### SANITARY ENGINEERING

Professor R. E. Stiemke, Faculty Adviser

Because Sanitary Engineering so vitally concerns the health of the people, and because of the progress in North Carolina in this field, the demand for men trained in Sanitary Engineering has increased.

The Sanitary Engineering option is offered to meet this need. In the main it is the curriculum in General Civil Engineering with selected courses in Bacteriology, Chemical Engineering, and Sanitary Engineering.

As there is a large demand in this State for men familiar with the design and operation of water and sewage plants, special attention is given to the actual design and practical operation of water-purification and sewage-disposal plants.

The Sanitary Engineering Laboratory equipment is similar to that used in water- and sewage-plant laboratories; the student makes the same tests, using standard methods, as are made in water- and sewage-plant laboratories.

The City of Raleigh water-purification plant and the College gymnasium swimming-pool filter plant are available for practical demonstration and instruction. Through the coöperation of the Bureau of Sanitary Engineering, State Board of Health, located in Raleigh, the student has an opportunity to study all phases of its works, not only in Sanitary Engineering, but also in the broad field of public health.

Upon graduation, students are prepared to hold positions as water- and sewage-plant operators, assistant resident engineers with private consulting engineers, junior engineers with state boards of health, and with the United States Public Health Service. After a few years of experience, graduates may be expected to advance to positions as superintendents of waterworks, city engineers and city managers, consulting engineers, state sanitary engineers, and senior engineers with the United States Public Health Service.

The curriculum of the Sanitary Engineering Option has been reviewed and the Laboratory and equipment inspected by the Engineers' Council for Professional Development. The Council has indicated its approval by accrediting this option.

### TRANSPORTATION ENGINEERING

Professor W. F. Babcock, Faculty Adviser

Advancement in study and improvements in construction in the ways and means of modern-day travel have progressed so rapidly in the last decade

that each division presents a field of study and investigation of its own. The railways, the highways, the inland waterways, and the airways, each performing to some extent a specific purpose, have covered our country with a transportation system far superior to any other in the world.

In order that young engineers may be trained to carry on and continue this expansion, specialized training in colleges must be available to students who wish to follow in this field.

Among the first college curriculum subdivision in the civil engineering profession was railroad engineering; this was followed by highway engineering; now that airplane travel has become so essential, it is found necessary to associate this means of travel with railroads and highways. With this in mind, the Department of Civil Engineering is offering the option Transportation Engineering, which includes a study of railroad maintenance of way, highway location and pavement design, economics of locations, waterways, airports, public relations and regulations, coordination of the different forms of transportation.

The curriculum of this option replaces the option formerly offered in Highway Engineering and follows along the same lines, broadening the scope of study to cover the field of transportation. The curriculum for the first two years is identical with and for the third year is practically the same as the regular Civil Engineering curriculum. In the fourth year, however, the student who specializes in Transportation Engineering is given more specific instructions in those subjects pertaining to the various means of transportation.

### CURRICULUM IN CIVIL ENGINEERING

**General Civil Engineering**  
**Sanitary Engineering**

**Construction and Building**  
**Materials Engineering**  
**Transportation Engineering**

For the Freshman Year, refer to page 106.

### Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303	4	4	4
*Business English, Public Speaking, Eng. 211, 231, and Elective English	3	3	3
Physics for Engineers, Phys. 201, 202, 203	4	4	4
Engineering Geology, Geol. 220	3	0	0
Theoretical Surveying, C.E. 221, 222, 223	3	3	3
Field Surveying, C.E. 225, 227	1	0	1
Mapping, C.E. 226	0	1	0
Engineering Mechanics, E.M. 311, 312	0	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sport Activities, P.E. 201, 202, 203	1	1	1
	—	21	21
	21		21

Surveying, C.E. s310, concurrent with Summer School, 3 credits.

\* Students who have been certified by the Department of English as proficient in English may substitute for the courses listed Elementary French, M.L. 101, 102, 201, or equivalent.

† Or six credits in one or two of the following Departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

## Junior Year

## Required

COURSES	CREDITS		
	First Term	Second Term	Third Term
Engineering Mechanics, E.M. 313	3	0	0
Strength of Materials, E.M. 321, S22	0	3	3
Materials of Construction, C.E. 321	3	0	0
General Economics, Econ. 201, 202, 203	3	3	3
	— 9	— 6	— 6

Choice must be made of one of the following:

## GENERAL CIVIL OPTION

Elements of Electrical Engineering, E.E. 320, 321	3	3	0
Technical Writing I, Eng. 321	3	0	0
Transportation Engineering I, C.E. 372, 373	0	3	3
Fluid Mechanics, E.M. 330	0	3	0
Hydraulics, C.E. 343	0	0	3
Engineering Thermodynamics, M.E. 307	0	0	3
Electives	3	6	3
	— 18	— 21	— 18

## CONSTRUCTION AND BUILDING MATERIALS OPTION

Construction Engineering I, C.E. 362, 363	0	3	3
Sanitary and Mechanical Equipment of Buildings, C.E. 365	3	0	0
Specifications, C.E. 367	0	0	3
Architectural Details, Arch. 306	0	0	2
Building Materials, Arch. 409, 410	0	3	3
Principles of Accounting, Econ. 301, 302	3	3	0
Applied Psychology for Engineers, Psychol. 335, 336	3	3	0
Electives	3	8	3
	— 21	— 21	— 20

## SANITARY OPTION

Elements of Electrical Engineering, E.E. 320, 321	3	3	0
Transportation Engineering I, C.E. 372, 373	0	3	3
Fluid Mechanics, E.M. 330	0	3	0
Hydraulics, C.E. 343	0	0	3
General Bacteriology, Bot. 402	0	4	0
Aquatic Biology, Bot. 473	0	0	2
Sanitary Engineering, C.E. 383	0	0	3
Treatment of Water and Sewage, Chem. E. 308	3	0	0
Electives	3	3	3
	— 18	— 22	— 20

## TRANSPORTATION OPTION

Elements of Electrical Engineering, E.E. 320, 321	3	3	0
Transportation Engineering I, C.E. 372, 373	0	3	3
Fluid Mechanics, E.M. 330	0	3	0
Hydraulics, C.E. 343	0	0	3
Engineering Thermodynamics, M.E. 307	0	0	3
Accounting for Engineers, Econ. 212	3	0	0
Business Law, Econ. 307	0	3	0
Technical Writing I, Eng. 321	0	0	3
Electives	6	3	3
	— 21	— 21	— 21

<sup>1</sup> To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

## Senior Year

## Required

COURSES	CREDITS		
	First Term	Second Term	Third Term
Reinforced Concrete, C.E. 421, 422 .....	3	3	0
Graphic Statics, C.E. 423 .....	1	0	0
Theory of Structures, C.E. 431, 432 .....	3	3	0
Structural Design, C.E. 426, 427 .....	0	3	3
	—	—	—
	7	9	8

Choice must be made of one of the following:

## GENERAL CIVIL OPTION

Materials Testing Laboratory, C.E. 322, 323 .....	0	1	1
Applied Astronomy, C.E. 453 .....	4	0	0
Transportation Engineering II, C.E. 471, 472 .....	3	3	0
Sanitary Engineering Laboratory, C.E. 481, 482 .....	1	1	0
Waterworks, C.E. 485 .....	3	0	0
Sewerage, C.E. 486 .....	0	3	0
Soil Mechanics, C.E. 435 .....	0	0	3
Aerial Surveying, C.E. 455 .....	0	0	3
Business Law, Econ. 307 .....	0	0	3
Electives .....	3	3	6
	—	—	—
	21	20	19

## CONSTRUCTION AND BUILDING MATERIALS OPTION

Elements of Electrical Engineering, E.E. 320, 321 .....	3	3	0
Electrical Equipment of Buildings, E.E. 343 .....	0	0	3
Construction Engineering II, C.E. 461, 462, 463 .....	3	3	8
Marketing Methods and Sales Management, Econ. 311, 312, or Corporation Finance, Econ. 320, and Labor Problems, Econ. 331 .....	3	3	0
Personnel Management, Econ. 333 .....	0	0	3
Business Law, Econ. 307 .....	0	0	3
Electives .....	3	3	3
	—	—	—
	19	21	18

## SANITARY OPTION

Materials Testing Laboratory, C.E. 322, 323 .....	0	1	1
Soil Mechanics, C.E. 435 .....	0	0	3
Sanitary Engineering Laboratory, C.E. 481, 482 .....	1	1	0
Waterworks, C.E. 485 .....	3	0	0
Sewerage, C.E. 486 .....	0	3	0
Water Purification, C.E. 488 .....	0	3	0
Sewage Disposal, C.E. 489 .....	0	0	3
Financing of Sanitary Utilities, C.E. 483 .....	0	0	3
Business Law, Econ. 307 .....	3	0	0
Technical Writing I, Eng. 321 .....	0	0	3
Electives .....	6	3	3
	—	—	—
	20	20	19

## TRANSPORTATION OPTION

Materials Testing Laboratory, C.E. 322, 323 .....	0	1	1
Applied Astronomy, C.E. 453 .....	4	0	0
Transportation Engineering II, C.E. 471, 472 .....	3	3	0
Transportation Design, C.E. 473 .....	2	0	0
Highway Engineering, C.E. 474, 475 .....	0	3	3
Soil Mechanics, C.E. 435 .....	0	0	3
Business Organization, Econ. 305 .....	0	0	3
Electives .....	3	3	6
	—	—	—
	19	19	19

NOTE: For the duration of the war, the above junior and senior curricula will be superseded by the consolidated curriculum shown on the following page.

**JUNIOR AND SENIOR CONSOLIDATED CURRICULUM IN CIVIL  
ENGINEERING DEPARTMENT TO BE EFFECTIVE FOR THE  
DURATION OF THE WAR**

**Junior Year**

COURSES	CREDITS		
	First Term	Second Term	Third Term
Engineering Mechanics, E.M. 313	3	0	0
Strength of Materials, E.M. 321, 322	0	3	3
Elements of Electrical Engineering, E.E. 320, 321	3	3	0
Materials of Construction, C.E. 321	3	0	0
Fluid Mechanics, E.M. 330	0	3	0
Hydraulics, C.E. 343	0	0	3
Transportation Engineering I, C.E. 372, 373	3	3	0
Transportation Engineering II, C.E. 471	0	0	3
Technical Writing I, Eng. 321	0	3	0
Engineering Thermodynamics, M.E. 307	0	0	3
General Economics, Econ. 201, 202, 203	3	3	3
Surveying, C.E. s310 A, B, C	1	1	1
Electives	3	3	3
	<hr/>	<hr/>	<hr/>
	19	22	19

**Senior Year**

Reinforced Concrete, C.E. 421, 422	3	3	0
Graphic Statics, C.E. 423	1	0	0
Structural Design, C.E. 426, 427	0	3	3
Theory of Structures, C.E. 431, 432	3	3	0
Soil Mechanics, C.E. 435	3	0	0
Applied Astronomy, C.E. 453	0	0	4
Aerial Surveying, C.E. 455	3	0	0
Sanitary Engineering Laboratory, C.E. 481, 482	0	1	1
Watertworks, C.E. 485	0	3	0
Sewerage, C.E. 486	0	0	3
Materials Testing Laboratory, C.E. 322, 323	1	1	0
Construction Engineering I, C.E. 362, 363	0	3	3
Specifications, C.E. 367	0	0	3
Business Law, Econ. 307	3	0	0
Electives	3	3	3
	<hr/>	<hr/>	<hr/>
	20	20	20

**DIESEL ENGINEERING**

In co-operation with the Navy Department, the college recently has completed a new Diesel Engineering Laboratory Building. The building cost approximately \$200,000 and the naval equipment installations are complete and modern.

The facilities of the Diesel Laboratory are now being devoted entirely to the war program through the training of officers for Diesel propelled ships in the United States Navy.

It is anticipated at the termination of the war that the building and equipment will be available for regular college instruction including both basic fundamental courses for undergraduate students and special courses in design, production, and research for graduate students.

Beginning students interested in this field, for the present, register in Mechanical Engineering. Diesel Engineering is a specialty within this field and the facilities for Diesel instruction will undoubtedly be available for civilian students by the time they have received their fundamental training in Mechanical Engineering.

## DEPARTMENT OF ELECTRICAL ENGINEERING

Professor R. S. Fouraker, Acting Chairman

Professors William Hand Browne, Jr., J. E. Lear; Associate Professors K. B. Glenn, L. M. Keever; Assistant Professors R. J. Pearsall, E. W. Winkler; Laboratory Technician J. H. Nichols.

**Buildings and Equipment.**—The Department is housed in Daniels Hall. This is an L-shaped building, the main part of which is four stories of brick, stone and steel construction, with a two-story wing of shop construction.

**Laboratories.**—The laboratories can be classified as follows: Dynamo, Communications and Transmission; Photometric, Measurements, Standards, High-Tension, and Electronics. The Dynamo, High-Tension, and Electronics Laboratories are located in the wing; all the others are in the basement of Daniels Hall.

The Dynamo Laboratory is sixty by eighty feet in area. Here the characteristics and operating conditions of representative types of machines are studied. This laboratory has a total of approximately 300 kva of motors and generators (about 50 in all). There are about 150 kilowatts available in motor-generator sets, and rotary converters.

There are also available approximately 150 kva of transformers for tests.

The laboratory is well supplied with accessory equipment, such as load units, field rheostats, starting boxes, prony brakes, inductances, capacitors, and other devices.

The Communications and Transmission Laboratory is equipped for measurements and tests on communication and power-transmission circuits. It contains an outstanding artificial power-transmission line on which power-transmission-line characteristics can be duplicated for study and testing. A complete long-line telephone system, with two two-way repeaters and associated apparatus, arranged for all usual and several special tests, is another feature of this laboratory. Other equipment for study and test includes an artificial line for the study of corona effects, artificial telephone lines, telephone central-station equipment, telegraph equipment, teletype-writer equipment, and a complete 100-line private automatic exchange with its associated appliances. Test equipment includes standard oscillators, transmission-measuring sets, noise-measuring sets, power-level instruments, audibility meters, attenuators, and apparatus for measuring distortion.

The Photometric Laboratory is housed in a room especially fitted up for the purpose. The equipment includes photometric standard lamps, two 300-cm. Leeds & Northrup photometer bars, a 36" Ulbrecht spherical photometer, two Macbeth-Evans Illuminometers, several Weston foot-candle meters, and other portable photometers. There is also the usual list of accessories, such as sight boxes of the Lummer-Brodhun and flicker types, rotating disks, and screens.

The Measurements Laboratory is arranged for making standard and special tests and measurements on the fundamental electrical units. The apparatus includes standards of resistance, inductance and capacitance, with special bridges for the measurement of each, Fahy permeameter and Epstein core-loss test sets for magnetic measurements on iron and steel, a double-bridge and oil-bath arrangement for conductivity measurements, and other special test appliances.

The Standards Laboratory is arranged for making accurate calibration tests on all types of electrical instruments. There are two specially designed test tables equipped with convenient means of controlling current and voltage. A large number of high-quality instruments of all types is provided. These include standard cells, a Leeds-Northrup Type-K and a Queen-Gray Potentiometer, standard voltmeters, ammeters, wattmeters, watt-hour meters, transformers, resistances, condensers and inductances. Certificates of accuracy from the National Bureau of Standards in Washington, D. C., have been obtained for many of these instruments. Special equipment used includes a sine-wave generator, a constant-speed frequency set, Silsbee current- and potential-transformer test sets, and others.

The High-Tension Laboratory has a  $7\frac{1}{2}$ -kva, 50,000-volt, and a 10-kva, 100,000-volt transformer. The induction regulators, which go with these transformers make it possible to vary the voltage from zero to 150,000 volts. There is also standard oil-testing equipment for testing transformer oil, a standard spark gap, and numerous insulators of various types for carrying on routine tests. Frequent use is made of the cathode-ray oscilloscope in studying surges and other disturbances.

**The Electronics Laboratory.**—The Electronics Laboratory is arranged for testing electronic devices and their associated equipment and circuits. It is supplied with the various types of electron tubes, including vacuum tubes, gaseous tubes, phototubes, mercury-vapor tubes, cathode-ray tubes, and apparatus for operating and testing them. The test equipment includes vacuum-tube bridge and test sets, oscilloscopes, television equipment, and the various sensitive instruments required for electronic measurements.

**Instrument Room and Shop.**—A centrally located Instrument Room serves all of the laboratories. Instruments are issued upon requisition and returned at the end of the laboratory period. They are kept in repair by a competent man, who divides his time between the care of the instruments and the Departmental Shop, which adjoins the Instrument Room. The Shop is fitted up with sufficient tools for making all minor repairs to laboratory equipment, as well as apparatus for special research.

The Storage-Battery Room contains two 120-volt, 100-ampere-hour batteries; two 12-volt, 200-ampere-hour batteries, the complete battery and counter emf cells for operating the automatic telephone station, and portable cells of various types. Motor-generator sets, and mercury-vapor and tungar rectifiers are provided for charging the batteries.

The Purpose of the Curriculum is to train young men for active work in a wide and diversified field. The electrical industry demands, above all else, a thorough preparation in the sciences underlying all branches of engineering, a broad foundation in fundamental electrical theory, and a clear understanding of the characteristics of electrical machinery and systems. These factors are essential for success, whether it be in the design and manufacture of electrical equipment, in power production and utilization, or the fields of communication and signaling, since in all these branches of the industry technical advances are being made with increasing rapidity. With this object in view, the curriculum in Electrical Engineering includes comprehensive training in mathematics, physics, and chemistry—the fundamental sciences—and adequate training in allied branches of engineering. All courses are accompanied by coördinated work in the laboratory and intensive drill in the applications of theory by means of carefully planned problems. In the senior year, the student is offered two options, one in the fundamentals of communication, the other in the field of industrial applications.

The curriculum includes a thorough drill in the preparation of technical reports. There is a decided trend in industry to select for high administrative positions men who have had good technical training and have in addition developed executive ability. The electives included in the curriculum in Electrical Engineering enable a student inclined toward executive work to take nonprofessional courses which deal with the economic and sociological problems of the day. On the other hand, those students who prefer the more technical phases of engineering can select electives specially helpful in that particular branch of the profession into which they wish to go. Students are urged to plan as early as possible a worth-while group of elective courses so chosen as to round out their curriculum.

Each student is also required to spend at least six weeks in satisfactory industrial employment before receiving his degree.

Close coördination in the work of the American Institute of Electrical Engineers is effected through a student branch at the College, which meets twice a month, through the State Section of the Institute, which meets several times during the year, and through the regional meetings of the Institute, one section of which is organized as a student-activities conference.

## CURRICULUM IN ELECTRICAL ENGINEERING

For the Freshman Year, refer to page 106.

Surveying, C.E. 8200, 3 credits, is required in the summer immediately following the freshman year.

## Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303 .....	4	4	4
Physics for Engineers, Phys. 201, 202, 203 .....	4	4	4
*Business English, Public Speaking, Eng. 211, 231, and Elective English .....	3	3	3
General Economics, Econ. 201, 202, 203 .....	3	3	3
Forge and Welding Practice, M.E. 128 .....	0	0	3
†Electrical Engineering Fundamentals, E.E. 201, 202 .....	3	3	0
‡Military Science II, Mil. 201, 202, 203 .....	2	2	2
Sport Activities, P.E. 201, 202, 203 .....	1	1	1
	—	—	—
	20	20	20

## Junior Year

Engineering Mechanics, E.M. 311, 312, 313 .....	3	3	3
Elementary Mechanism, M.E. 215, 216, 217 .....	1	1	1
Engineering Thermodynamics, M.E. 307, 308, 309 .....	3	3	3
Mechanical Engineering Laboratory I, M.E. 313, 314, 315 .....	1	1	1
Fundamentals of Electronics, E.E. 315 .....	0	0	3
Differential Equations, Math. 431a .....	3	0	0
Elementary Modern Physics, Phys. 407 .....	0	3	0
Electrical Engineering, E.E. 301, 302, 303 .....	4	4	4
Electrical Engineering Laboratory I, E.E. 311, 312, 313 .....	2	2	2
Electives .....	3	3	3
	—	—	—
	20	20	20

Summer requirements: Six weeks industrial employment.

## Senior Year

Engineering Economics, I.E. 301 .....	3	0	0
Accounting for Engineers, Econ. 212 .....	0	3	0
Business Law, Econ. 307 .....	0	0	3
Strength of Materials, E.M. 320 .....	3	0	0
Electrical Industry, I.E. 402 .....	0	3	0
Fluid Mechanics, Hydraulic Machinery, E.M. 330, 331 .....	3	3	0
Illumination, E.E. 437 .....	0	0	3
Technical Writing, Eng. 321 .....	0	0	3
Alternating Current Machinery, E.E. 401, 402 .....	4	4	0
Electric Transmission, E.E. 403 .....	0	0	4
Electrical Engineering Laboratory, E.E. 411, 412, 413 .....	2	2	2
First Option .....			
Electric Power Applications, E.E. 421, 422, 423 .....	3	3	3
Electric Communication, E.E. 425, 426, 427 .....	3	3	3
Second Option .....			
Electives .....	3	3	3
	—	—	—
	21	21	21

NOTE: For the duration of the war the above curriculum will be superseded by the modified curriculum shown on the following page.

\* Students who have been certified by the Department of English as proficient in English may substitute for the courses listed a Modern Language.

† Sophomore class is divided into two sections, one half taking Fundamentals and Metal Work as scheduled, the other half taking the Metal Shop during the Fall Term and the Electrical Engineering Fundamentals the second and third terms.

‡ Or 6 credits in one or two of the following Departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

## CURRICULUM IN ELECTRICAL ENGINEERING

(Modified curriculum as now offered for the duration of the war)

For the Freshman Year, refer to page 106.

Surveying, C.E. 5200, 8 credits, is required in the summer immediately following the freshman year.

## Sophomore Year

COURSES		First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 203	.....	4	4	4
Physics for Engineers, Phys. 201, 202, 203	.....	4	4	4
*Business English, Public Speaking, Eng. 211, 231, and Elective English	.....	3	3	3
General Economics, Econ. 201, 202	.....	3	3	0
Forge and Welding Practice, M.E. 128	.....	0	0	3
Electrical Engineering Fundamentals, E.E. 201, 202, 203	.....	3	3	3
†Military Science II, Mil. 201, 202, 203	.....	2	2	2
Sport Activities, P.E. 201, 202, 203	.....	1	1	1
	—	20	20	20

## Junior Year

Engineering Mechanics, E.M. 311, 312, 313	.....	3	3	3
Elementary Mechanism, E.M. 215, 216, 217	.....	1	1	1
Engineering Thermodynamics, M.E. 307, 308, 309	.....	3	3	3
Mechanical Engineering Laboratory I, M.E. 313	.....	1	0	0
Differential Equations, Math. 431a	.....	3	0	0
Electrical Engineering, E.E. 301, 302, 303	.....	4	4	4
Electrical Engineering Laboratory I, E.E. 311, 312, 313	.....	2	2	2
Fundamentals of Electronics, E.E. 315, 316	.....	0	4	4
Electives	.....	3	3	3
	—	20	20	20

Summer requirements: Six weeks industrial employment.

## Senior Year

Strength of Materials, E.M. 321	.....	0	3	0
Engineering Economics, I.E. 301	.....	3	0	0
Technical Writing, Eng. 321	.....	0	0	3
Fluid Mechanics, E.M. 330	.....	3	0	0
Alternating Current Machinery, E.E. 401, 402	.....	4	4	0
Electric Transmission, E.E. 403	.....	0	0	4
E.E. Laboratory, E.E. 411, 412, 413	.....	2	2	2
Electric Communications E.E. 425, 426, 427	.....	3	3	3
Ultra High Frequency Techniques, E.E. 445, 446, 447	.....	4	4	4
Electives	.....	3	3	3
	—	22	19	19

\* Students who have been certified by the Department of English as proficient in English may substitute for the courses listed a Modern Language.

† Or six credits in one or two of the following Departments: Economics, Psychology, History and Political Science, Modern Language, Sociology.

**GENERAL ENGINEERING****The Curriculum in Engineering Leading to the Degree,  
Bachelor of Science in Engineering**

Professor G. Wallace Smith, Administrative Officer

We live in a world of applied science; for that reason, the cultured gentleman of the twentieth century must know something of Engineering.

Engineering is not only a means of earning a livelihood; it is also a culture, a manner of thinking and living. It is founded upon the pure sciences of Mathematics, Physics, and Chemistry. It deals largely with Materials, Methods, Men, and Money. There appears to be an increasing demand for a curriculum which will offer to young men the opportunity to study Engineering as a field of culture, with no specific purpose of specialization but solely with the idea of obtaining a well-balanced thoroughly rigorous training and discipline in the basic principles of Engineering. Largely for this reason this curriculum is offered, and it omits no essential foundation stone in the present recognized Engineering curricula. The freshman year is identical with the other Engineering curricula. The sophomore, junior, and senior years maintain the basic fundamental courses, but the special technical courses as required in the other Engineering curricula are replaced by electives, which may be chosen according to the major interest of the student. However, a number of these electives must be chosen from courses that are outside of the technical and special technical fields.

The advantages of this curriculum are:

The student acquires a broad training in the basic principles of Engineering.

He has more electives and more freedom in the choice of these electives than in the specialized curricula.

If the student upon entering college is in doubt as to what particular field of specialization he desires, this curriculum will enable him to start his academic training and complete his first full year without losing time or credits required in any of the specialized curricula.

In his second year the student will receive the basic training required of all the engineering curricula and have an opportunity to elect courses that will prepare him for future study in some particular field of specialization in which he might be interested.

The proper use of electives throughout the last three years will, therefore, enable the student to complete the requirements for a degree in this curriculum and at the same time obtain a considerable number of credits for use in some specialized curricula, so that he can return to school for not more than one year and receive a degree in the particular field of study in which he has become interested.

## CURRICULUM IN GENERAL ENGINEERING

For the Freshman Year, refer to page 106.

## Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303	4	4	4
Physics, Phys. 201, 202, 203	4	4	4
<sup>1</sup> Business English, Public Speaking, Eng. 211, 231, and Elective English	3	3	3
<sup>2</sup> Military Science II, Mil. 201, 202, 203 or Alternate	2	2	2
Sport Activities, P.E. 201, 202, 203	1	1	1
<sup>4</sup> Electives	6	6	6
	20	20	20

Junior Year<sup>5</sup>

Engineering Mechanics, E.M. 311, 312, 313	3	3	3
Strength of Materials, E.M. 321	0	0	3
Engineering Geology, Geol. 220	0	0	3
Theory of Dynamics, M.E. 307, 308	3	3	0
<sup>1</sup> Mechanical Engr. Lab. I, M.E. 313, 314	1	1	0
Economics, Econ. 201, 202, 203, or other Social Science	3	3	3
<sup>3</sup> Military Science III, Mil. 301, 302, 303 or Alternate	3	3	3
<sup>4</sup> Electives	6	6	6
	19	19	21

## Senior Year

Elements of Elect. Engr. I, E.E. 320, 321	0	3	3
Elements of Elect. Engr. Lab. II, E.E. 325, 326	0	1	1
Theory of Structures, C.E. 431, 432	0	3	3
<sup>1</sup> Fluid Mechanics, E.M. 330	3	0	0
Accounting I, Econ. 301, 302, 303	3	3	3
Strength of Materials, E.M. 322	3	0	0
Business Law, Econ. 307	3	0	0
<sup>3</sup> Military Science IV, Mil. 401, 402, 403 or Alternate	3	3	3
<sup>4</sup> Electives	6	6	6
	21	19	19

<sup>1</sup> Students who have been certified by the Department of English as proficient in English may substitute for the courses listed a Modern Language.

<sup>2</sup> Or 6 credits in one or two of the following departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

<sup>3</sup> To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

<sup>4</sup> Free electives, except that not more than 39 term credits may be chosen from the technical or special technical courses in the School of Engineering.

<sup>5</sup> Students who contemplate the addition of a fifth year in Engineering for the purpose of obtaining a professional degree will consult the head of the department in which he intends to major and make such substitutions for the Engineering courses offered in this curriculum as are necessary for the satisfactory completion of the technical requirements of the degree sought.

**GEOLOGICAL ENGINEERING**

Professor Jasper L. Stuckey, Head of the Department

Assistant Professor John M. Parker\*

Instructor E. L. Miller, Jr.

**Function and Facilities.**—The function of the Department of Geology is twofold: first, to offer service courses required as prerequisites in the Agricultural, Educational, and Engineering curricula; second, to administer the curriculum in Geological Engineering.

The classrooms, laboratories, and offices of the Department are in Primrose Hall. The equipment includes a varied collection of minerals, rocks, and fossils, illustrating the materials of different parts of the earth's crust; laboratory equipment for carrying on qualitative chemical and blowpipe examination of minerals and rocks; microscopes and other optical equipment; facilities for making thin sections of rocks and minerals; geological models; a collection of topographic maps and geologic folios illustrating important and typical areas in the United States; laboratory testing equipment for mineral preparation and concentration; equipment for geo-physical exploration.

The Curriculum is designed to train young men in the fundamentals of engineering with its special application of geology. Many engineering undertakings, especially major construction projects, such as large dams and reservoirs, tunnels, large buildings, depend for success on exact knowledge of their geological setting. On the other hand, such geological problems as the economical development of mineral resources require the use of the precise methods of engineering. The curriculum combines these two sorts of information and training so necessary to success in this important specialized field.

**Professional Outlook.**—Geological engineering is a new and rapidly growing field of engineering. Geological engineers are unique in that a number of varied fields are open to them. They are in demand by State and Federal Surveys, by oil and mining companies for service here and abroad, by cities and municipalities, by engineering construction companies, by technical schools as teachers, and by many others.

For the young man who wants to live and practice his profession in the South this curriculum offers excellent training in the application of geological science to engineering construction, especially in foundations. The importance of this relationship has been emphasized in recent years by failures of engineering works such as dams, bridges, buildings, and highways, caused by the lack of thorough geological investigations.

The problem of supplying water to our growing cities and to the thousands of small communities and farms in the South is one that the geological engineer is well-trained to solve.

Many large cities have become aware of the importance of geological knowledge in subway construction, water distribution, building and bridge

\* On leave.

foundations, etc., and have geological engineers to handle problems which arise from such work. In the future, more of this kind of underground exploration will be performed in the interests of safety and economy.

The greatly increased transportation of the world in the next few years will tax heavily all of our transportation facilities, and harbors, rivers, coastal erosion, inland waterways, highways, railroads, and airports will demand many geological engineers.

The Southeast offers tremendous possibilities to geological engineers who are interested in the mineral industries. Here in this region are deposits of iron, coal, phosphates, mica, feldspar, spodumene, copper, nickel, kaolin, cyanite, barite, limestone, pyrophyllite, marls, and other minerals.

A graduate of this curriculum is trained to follow two broad fields of engineering either in the United States or in foreign countries: one, the application of geology to engineering work, and the other, the application of geology in the mineral industries.

## CURRICULUM IN GEOLOGICAL ENGINEERING

For the Freshman Year, refer to page 106.

### Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303 . . . . .	4	4	4
*Business English and Public Speaking, Eng. 211, 231, and Elective English . . . . .	3	3	3
Qualitative Analysis, Chem. 211 . . . . .	4	0	0
Quantitative Analysis, Chem. 212 . . . . .	0	4	0
Physics for Engineers, Phys. 201, 202, 203 . . . . .	4	4	4
Engineering Geology, Geol. 220 . . . . .	3	0	0
Historical Geology, Geol. 222 . . . . .	0	3	0
Mineralogy, Geol. 230 . . . . .	0	0	3
Geomorphology, Geol. 223 . . . . .	0	0	3
†Military Science II, Mil. 201, 202, 203 . . . . .	2	2	2
Sport Activities, P.E. 201, 202, 203 . . . . .	1	1	1
	21	21	20

### Junior Year

Engineering Mechanics, E.M. 311, 312, 313 . . . . .	3	3	3
Fluid Mechanics, E.M. 330 . . . . .	0	0	3
Strength of Materials, E.M. 321 . . . . .	0	0	3
Elements of Electrical Engineering, E.E. 320, 321 . . . . .	3	3	0
Physical Chemistry, Chem. 331 . . . . .	5	0	0
Theoretical Surveying, C.E. 221, 222 . . . . .	3	3	0
Field Surveying, C.E. 225 . . . . .	1	0	0
Mapping, C.E. 226 . . . . .	0	1	0
Stratigraphy and Index Fossils, Geol. 361 . . . . .	3	0	0
Petrology, Geol. 443 . . . . .	0	0	4
Advanced Mineralogy, Geol. 332 . . . . .	0	3	0
Structural Geology, Geol. 352 . . . . .	0	4	0
Geophysics, Geol. 353 . . . . .	0	0	4
Electives . . . . .	3	3	3
	21	20	20

\* Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

† Or six credits in one or two of the following departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

## Senior Year

COURSES	First Term	Second Term	CREDITS Third Term
General Economics, Econ. 201, 202, 203 .....	3	3	3
Business Law, Econ. 307 .....	0	3	0
Optical Mineralogy, Geol. 431, 432, 433 .....	3	3	3
Engineering Thermodynamics, M.E. 307 .....	3	0	0
Technical Writing I, Eng. 321 .....	3	0	0
Economic Geology, Geol. 411, 412, 413 .....	3	3	3
Advanced Engineering Geology, Geol. 462 .....	0	3	0
Geological Surveying, Geol. 463 .....	0	0	4
Mining Engineering, Mine Design, and Ore Dressing, Geol. 471, 472, 473 .....	3	3	3
Electives .....	3	3	8
	<hr/>	<hr/>	<hr/>
	21	21	19

## INDUSTRIAL ENGINEERING

\*Professor F. F. Groseclose

North Carolina has an abundance of natural resources, and its industries are progressing steadily, which facts mean that there are increasing needs for educated personnel and informed leaders to deal with the complexities of modern industries.

Engineers have had a surprisingly large share in America's amazing industrial progress through their engineering knowledge and the adaptation of engineering methods and approach to the solution of industrial problems. To be even more effective in industry and modern life, engineers should, to their study of engineering, add knowledge of the economic and social sciences since they must deal, not only with the materials and forces of nature, but also with men, money, and affairs, in their industrial relations.

The aim of the curriculum in Industrial Engineering is to prepare students to enter the employ of industries as engineering graduates, then through experience, to develop into positions of responsibility and service, and thus to meet the demands of industries for men educated as engineers with special preparation for the activities of industries.

The curriculum provides thorough education in the fundamentals of engineering, with a three term course in each Mechanical and Electrical Engineering. Accounting, Economics, and Psychology are emphasized. The special technical courses apply engineering methods in the studies of industry, to the end that students may learn to make engineering, economic, and social analyses concurrently, and to apply them to the conduct of enterprises.

Electives from engineering and other courses, approved by the adviser, offer opportunity for the development of individual aptitudes. Students in Industrial Engineering get class and laboratory instruction from other

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\* On military leave.

Engineering Departments and from other courses, which are correlated and extended by the Industrial Engineering courses.

The classrooms and offices of Industrial Engineering are in rooms 125 to 132, on the first floor of 1911 Building.

Attention is directed to the course in Motion and Time Study (I. E. 322) which is required of Industrial Engineering juniors and is elective for others.

### CURRICULUM IN INDUSTRIAL ENGINEERING

For the Freshman Year, refer to page 106.

#### Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303 . . . . .	4	4	4
*Business English, Public Speaking, Eng. 211, 231, and Elective English . . . . .	3	3	3
Physics for Engineers, Phys. 201, 202, 203 . . . . .	4	4	4
General Economics, Econ. 201, 202, 203 . . . . .	3	3	3
Shopwork, M.E. 124, 125, 126 . . . . .	2	2	2
Industrial Organization, I.E. 101, 102, 103 . . . . .	3	3	3
†Military Science II, Mil. 201, 202, 203 . . . . .	2	2	2
Sport Activities, P.E. 201, 202, 203 . . . . .	1	1	1
	—	—	—
	22	22	22

#### Junior Year

Engineering Mechanics, E.M. 311, 312, 313 . . . . .	3	3	3
Strength of Materials, E.M. 321 . . . . .	0	0	3
Engineering Thermodynamics, M.E. 307, 308, 309 . . . . .	3	3	3
Mechanical Engineering Laboratory I, M.E. 313, 314, 315 . . . . .	1	1	1
Machine Shop II, M.E. 227, 228, 229 . . . . .	1	1	1
Factory Equipment, M.E. 224 . . . . .	3	0	0
Principles Accounting, Econ. 301, 302, 303 . . . . .	3	3	3
Management Engineering, I.E. 201, 202, 203 . . . . .	3	3	3
Motion and Time Study, I.E. 322 . . . . .	0	3	0
Electives . . . . .	3	3	3
	—	—	—
	20	20	20

Summer requirement: Six weeks industrial employment.

#### Senior Year

Technical Writing I, Eng. 321 . . . . .	0	3	0
Business Law, Econ. 307 . . . . .	3	0	3
Industrial Psychology, Psychol. 338 . . . . .	0	0	3
Materials of Construction, C.E. 321 . . . . .	3	0	0
Elements of Electrical Engineering, E.E. 320, 321, 322 . . . . .	3	3	3
Electrical Engineering Laboratory, II, E.E. 325, 326, 327 . . . . .	1	1	1
Engineering Economics, I.E. 301 . . . . .	0	3	0
Electrical Industry, I.E. 402 . . . . .	0	3	0
Industrial Engineering Problems, I.E. 312, 313 . . . . .	0	3	3
Investigation and Report, I.E. 433 . . . . .	0	0	3
Electives . . . . .	6	6	6
	—	—	—
	19	19	19

\* Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

† Or six credits in one or two of the following departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology, Ethics and Religion.

## MECHANICAL ENGINEERING

Professor R. B. Rice, Executive Officer of the Department  
Professors H. B. Briggs, E. G. Hoefer, W. G. Van Note, F. B. Wheeler;  
Associate Professors W. S. Bridges, T. C. Brown, W. E. Selkinghaus;  
Assistant Professors W. E. Adams, R. L. Cope, M. R. Rowland; Instructors F. C. Bragg, T. E. Hyde, P. B. Leonard, W. Loewensberg, C. W. Maddison, W. G. Mendenhall, W. M. Neale, E. H. Stinson.

**Purposes.**—The Mechanical Engineer is primarily a designer and builder of machines and other equipment for use in manufacturing processes, transportation, and the generation of power. He is responsible for the conservation and economical use of the power-producing resources of the world through the application of the proper equipment in each field of production. He is called upon to take charge of the executive management of the manufacturing, transportation, and power industries. For the Mechanical Engineer to be well grounded in his profession, he must be thoroughly familiar with both the science and the art of engineering.

The curriculum in Mechanical Engineering begins with a thorough training in Mathematics, Physics, and Chemistry, as a foundation for the technical work which is later developed along several parallel lines. The student is taught how these fundamental sciences are applied to the physical properties of the materials of construction, and to the transformation of heat energy into work and power. This is accomplished by means of courses in Drafting, Metallurgy, Mechanics, and Thermodynamics; through the work in the wood shop, forge and welding shop, foundry, and machine shop; by the tests performed in the mechanical laboratories.

Through the training offered in this curriculum it is hoped that the young graduate, after gaining some experience in industry, will be qualified to accept the responsibilities which will be imposed upon him in the professional field of Mechanical Engineering.

**Buildings and Equipment.**—The Department of Mechanical Engineering occupies both Page Hall and the Park Building. In Page Hall are the offices of the Department, offices for the Drawing Division and the Laboratory Division, classrooms, drafting rooms, the Internal-Combustion-Engine Laboratory, and Hydraulics and Fluid Flow Laboratory. The Park Building contains the Mechanical Engineering Laboratory, the Metallurgy Laboratory, the Heating and Air-Conditioning Laboratory, the Wood Shop, the Foundry, the Forge and Welding Shop, and the Machine Shop. It also contains the offices of the Faculty in the several Shops and one classroom.

**Drafting Rooms.**—The drafting rooms are equipped with tables, stools, cases for boards, reference files, and models. The drafting rooms have two Universal Drafting Machines in addition to other necessary equipment. The blueprint room contains an electric blueprint machine, a sheet washer, and

an ozalid printing machine, besides the usual sun frames. Fluorescent lights are used in the drafting rooms.

**Shops.**—The Wood Shop is equipped with a variety of woodworking machines: lathes, combination saw, dado saw, cut-off saw, jointer, mortiser, sanders, moulder, sticker, trimmer, shaper, boring machines, band saws, jig saw, various types of clamps, a glue room, and other essentials that go to make an up-to-date shop. The machines are motor driven with either individual or group drive. The shop includes work benches, hand tools and necessary auxiliary equipment and a modern spray-gun for finishing surfaces.

The Foundry Equipment consists of a 36" cupola, a 22" cupola, brass furnace, core oven, core machine, moulding machines, cleaning mill, motor-driven elevator, emery wheel and buffer, and the necessary tools and patterns for practical moulding. Sand-testing equipment is available for experimental work.

The Forge and Welding Shop is equipped with thirty anvils and forges, the blast for the forges being produced by a large powder blower and regulated by individual controls on each forge. The shop is also equipped with a modern down-draft-type exhaust system. Other equipment consists of iron shears, vises, emery wheels, and other necessary forging equipment. A 300-ampere direct-current electric welder and a ten-station oxy-acetylene welding-manifold system completes this equipment.

The Machine Shop, well heated, lighted, and ventilated, is equipped with work benches, machinist's vises, and a variety of machine tools: engine lathes, bench lathes, shapers, planers, milling machines, vertical and horizontal boring mills, drill presses, slotting machines, grinders, arbor presses, and a variety of hand tools, cutters, clamps, jigs, and other equipment necessary to modern machine-shop practice. Some of the machines are group driven, others are individually driven.

**Laboratories.**—The Heat-Power, Heating and Air-Conditioning, and Metallurgical Laboratories are located in the Park Building. The Heat-Power Laboratory is equipped with plain slide-valve, automatic cut-off, multiple-expansion, and uniflow engines arranged for condensing and noncondensing operation. It is provided with a turbo-generator set complete with a high-vacuum condenser. A two-stage air compressor driven by a uniflow engine supplies air for experimentation. Weighing tanks and steam pumps make possible tests in this field. This division of the laboratory is equipped with instruments and apparatus for making coal and gas analyses and tests, lubrication tests, calibration tests, heat-transfer tests, nozzle tests, and general efficiency and thermodynamic tests.

The Heating and Air-Conditioning division of the laboratory contains several heating boilers with appropriate oil-burning equipment, weighing tanks and instruments for complete tests. The laboratory is also equipped with an air conditioner, unit heaters, radiator-testing equipment, a half-ton refrigeration machine, insulation-testing equipment and a fan-and-duct testing unit.

The Metallurgical Laboratory is equipped for work dealing with the structure and the physical and mechanical properties of metals and alloys. The equipment includes electric and gas heat-treating furnaces with controls; indicating and recording pyrometers; apparatus for polishing and etching specimens; metallurgical microscopes with complete lens combinations; dark rooms for photographic; and, photoelastic equipment. The laboratory is equipped with 15,000-lb. and 50,000-lb. material-testing machines.

The Hydraulic-Machinery, and Internal-Combustion-Engine Laboratories are housed in the basement of Page Hall. The Laboratories are equipped with a new twenty-inch wind tunnel capable of speeds in excess of 100 miles per hour. The tunnel is equipped with automatic balances. A smokebox is provided for flow-analysis work. Photographic equipment is provided for flow study.

The Hydraulic Testing Laboratory contains a ten-inch Francis-Type Hydraulic Turbine, of the most modern design, directly connected to an electric dynamometer, together with weir, Venturi, flume, and instruments for complete test. The laboratory has high-speed and low-speed centrifugal pumps arranged for tests, also Venturi tubes, weirs, nozzles, meters, and a hydraulic channel for the study of flow.

The Internal-Combustion-Engine Laboratory is equipped with high-speed and low-speed compression-ignition engines, automotive and stationary spark-ignition engines, air-cooled and liquid-cooled aircraft engines, all of modern design. Each of the test engines, of which there are ten at present, is equipped with its power-absorbing device, such as club-propellers in the case of aero engines and water brakes, calibrated electric generators and electric cradle-dynamometers for the other engines. A 5-hp. electric dynamometer is provided for accessory testing and a 125-hp. dynamometer for high-speed-engine testing. Engines, carburetors, ignition equipment and accessories are provided for study. C.F.R.-A.S.T.M. units are available for gasoline and diesel fuel research.

Recent additions to the Internal Combustion Laboratory consist of a 500 H.P. twelve cylinder Vee-type marine diesel engine; two 150 H.P. 6 cylinder high-speed marine diesel engines; a high-speed automotive type 85 H.P. diesel; a 60 H.P. stationary diesel engine with direct connected generators; a complete inventory of diesel fuel-pumps, nozzles, governors, transfer pumps, and allied equipment together with a fuel-pump testing and calibrating unit, nozzle testors, and spray analyzers. The laboratory is also equipped with high-speed indicators of the cathode ray type and vibration analyzers for the study of motion and vibration of engine parts; and a centrifugal super-charging testing unit with a high-speed dynamometer.

All of the laboratories are designed around the unit system for instruction, whereby units in or whole divisions of the laboratory may be operated without depending on or interfering with other units or divisions.

## CURRICULUM IN MECHANICAL ENGINEERING

For the Freshman Year, refer to page 106.

Surveying, C.E. s200, 3 credits, is required in the summer immediately following the freshman year.

## Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Calculus I, II, III, Math. 201, 202, 303	4	4	4
*Business English, Public Speaking, Eng. 211, 231, and Elective English	3	3	3
Physics for Engineers, Phys. 201, 202, 203	4	4	4
Mechanical Drawing, M.E. 211, 212, 213	2	2	2
Shopwork, M.E. 124, 125, 126	2	2	2
Engineering Mechanics, E.M. 311, 312	0	3	3
†Military Science, Mil. 201, 202, 203	2	2	2
Physical Education, P.E. 201, 202, 203	1	1	1
	18	21	21

## Junior Year

Engineering Mechanics, E.M. 313	3	0	0
Machine Shop II, M.E. 227, 228, 229	1	1	1
Engineering Thermodynamics, M.E. 307, 308, 309	3	3	3
Mech. Eng. Lab. I, M.E. 313, 314, 315	1	1	1
†Kinematics, M.E. 317, 318, 319	3	3	3
Materials of Construction, C.E. 321	0	3	0
Metallurgy, M.E. 322, 323	0	3	3
Strength of Materials, E.M. 321, 322	0	3	3
Fluid Mechanics, E.M. 330	0	0	3
Business Law, Econ. 307	3	0	0
Technical Writing, Eng. 321	3	0	0
**Electives	3	3	3
	20	20	20

Summer requirement: Six weeks of industrial employment.

## MECHANICAL ENGINEERING I—GENERAL OPTION

Professor R. B. Rice, Faculty Adviser

## Senior Year

General Economics, Econ. 201, 202, 203	3	3	3
Power Plants, M.E. 401, 402, 403	3	3	3
Heating and Air Conditioning, M.E. 404	0	3	0
Machine Design, M.E. 411, 412, 413	3	3	3
Refrigeration, M.E. 405	0	0	3
Mechanical Engineering Lab. II, M.E. 407, 408, 409	1	1	1
Elements of Electrical Engineering, E.E. 320, 321, 322	3	3	3
Electrical Eng. Lab. II, E.E. 325, 326, 327	1	1	1
Hydraulic Machinery, E.M. 381	3	0	0
**Electives	3	3	3
	20	20	20

\* Students who have been certified by the Department of English as proficient in English may substitute Modern Language for the courses listed.

† Or six credits in one or two of the following departments: Economics, Psychology, History, Modern Language, Sociology.

‡ Furniture Option, M.E. 341, 342, 343.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

(For the duration of this war the following optional curricula will be superseded by the General Option.)

## MECHANICAL ENGINEERING II—FURNITURE OPTION

Assistant Professor M. R. Rowland, Faculty Adviser

The purpose of this course is to train young men, who are interested in wood industries and want a practical and scientific insight into the art of designing and production of furniture, to enter the field of actual production of modern furniture and to lay a foundation for future work as managers, or executives in the wood products industries.

The equipment of the entire Mechanical Engineering Department is available for instruction. A comprehensive file of useful data on woods, material on period design, and trade literature are also available.

The fundamental courses in the Mechanical Engineering curriculum are required in this option, with particular emphasis placed on modern manufacturing methods, management of operation, costs of production, maintenance of plant, and practical design of wood products. A thorough drill in the preparation of technical drawings and reports is required. Each student will make one or more field trips to inspect typical wood industries and submit a report of his observations.

Each student will be required to spend at least six weeks in industrial employment before receiving his degree. This aids him in securing and satisfactorily holding a position upon graduation.

### Senior Year

Freshman, Sophomore and Junior years identical with the General Mechanical Engineering Curriculum.

Summer requirement: Six weeks of industrial employment.

COURSES	First Term	Second Term	Third Term
General Economics, Econ. 201, 202, 203 .....	3	3	3
Power Plants, M.E. 401, 402, 403 .....	3	3	3
Mech. Eng. Lab. III, M.E. 407, 408, 409 .....	1	1	1
Furniture Construction, M.E. 445, 446, 447 .....	3	3	4
Lumbering, For. 422 .....	0	3	0
Lumber Seasoning, For. 423 .....	0	0	2
Engineering Economics, I.E. 301 .....	3	0	0
Elements of Electrical Engineering II, E.E. 331, 332, 333 .....	4	4	4
**Electives .....	8	3	3
	—	—	—
	20	20	20

All seniors are required to go on the inspection trip as part of their curriculum.

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\*\* To be selected from the following fields. Humanities, Military Science III and IV. Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

### MECHANICAL ENGINEERING III—HEATING AND AIR-CONDITIONING OPTION

Professor E. G. Hoefer, Faculty Adviser

The Mechanical Engineering Department offers this option because of the increasing interest in heating and air conditioning for comfort; and furthermore because the engineering profession is largely responsible for the health and well-being of society through the effective construction and operation of heating and air-conditioning systems. Emphasis is placed on this phase of engineering through the application of fundamental principles to design, laboratory investigations and research. Through this means the student is given an opportunity to become familiar with standard practice in this field.

Freshman, Sophomore and Junior years identical with the General Mechanical Engineering Curriculum.

Summer requirement: Six weeks of industrial employment.

#### Senior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
General Economics, Econ. 201, 202, 203 . . . . .	3	3	3
Power Plants, M.E. 401, 402, 403 . . . . .	3	3	3
Heating and Air Conditioning Lab., M.E. 455, 456, 457 . . . . .	1	1	1
Hydraulics Machinery, E.M. 331 . . . . .	3	0	0
Heating and Air Conditioning II, M.E. 451, 452, 453 . . . . .	3	3	3
Heating and Air Conditioning Design, M.E. 458, 459 . . . . .	0	3	3
Elements of Elec. Engr. II, E.E. 331, 332, 333 . . . . .	4	4	4
**Electives . . . . .	8	8	8
	20	20	20

All seniors are required to go on the inspection trip as part of their curriculum.

### MECHANICAL ENGINEERING IV—METALS OPTION

Professor W. G. VanNote, Faculty Adviser

The Mechanical Engineer is becoming steadily more dependent upon metals and alloys for the efficient construction, operation, and maintenance of the varied engineering units under his supervision. Similarly in the design of improved and new units he is making increased demands upon the metal industry for materials of superior properties. Because of this close interdependence of mechanical engineering and metallurgy the Metals Option is offered. Emphasis is given to the control which may be exercised over the properties of metals through methods of manufacture and subsequent physical and thermal treatments. Since welding design and practice has a prominent place in the metallurgical applications made by the mechanical engineer, substantial instruction in this field is included in the option.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science, and Social Science.

Freshman, Sophomore and Junior years identical with the General Mechanical Engineering Curriculum.

Summer requirement: Six weeks of industrial employment.

General Economics, Econ. 201, 202, 203 .....	8	3	3
Elements of Elec. Eng., E.E. 320, 321, 322 .....	3	3	3
Electrical Engineering Lab., E.E. 325, 326, 327 .....	1	1	1
Machine Design, M.E. 411, 412, 413 .....	3	3	3
Power Plants, M.E. 401, 402 .....	3	3	0
M. E. Lab., III, M.E. 407, 408, 409 .....	1	1	1
Theory of Welding, M.E. 431, 432, 433 .....	1	1	1
Welding Practice, M.E. 435, 436, 437 .....	1	1	1
Physical Metallurgy, M.E. 441, 442, 443 .....	2	2	2
**Electives .....	3	3	3
	<hr/> 21	<hr/> 21	<hr/> 18

All seniors are required to go on the inspection trip as part of their curriculum.

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\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science and Social Science.

## DIVISION OF TEACHER EDUCATION

## Professors:

T. E. Browne, M.A., Director of the Division

Leon E. Cook, M.S., Agricultural Education

Edward W. Boshart, M.A., Industrial Arts Education, and Guidance

J. R. Ludington, Ph.D., Industrial Arts Education

J. K. Coggin, M.S., Agricultural Education

J. Warren Smith, M.S., Industrial Education

\*William McGehee, Ph.D., Psychology

## Associate Professors:

L. O. Armstrong, M.S., Agricultural Education

D. J. Moffie, Ph.D., Psychology

## Supervisor of Student Teachers in Industrial Arts

C. Merrill Hamilton, M.A., Industrial Arts Education

**Purposes.**—The Division of Teacher Education at North Carolina State College is organized and equipped for the purpose of carrying out a specific function allocated to the College by the trustees of the Greater University. The particular objective of this Division is to provide professional training, to organize curricula, and to give direction to those students who indicate an interest in becoming teachers of Vocational Agriculture, Trade and Industrial Education, Industrial Arts Education, and preparing themselves for the field of Guidance and Counseling. The technical subject matter instruction for such teachers is provided by the technical schools on the Campus.

The State Board for Vocational Education has designated State College as the training center for vocational teachers in the fields of Agriculture and Industrial Education, and federal funds are used to aid in the maintenance of teacher training in these two fields.

**Organization.**—The Division offers curricula for preparing teachers of Agriculture, of Industrial Arts, of Industrial Education, and of Occupational Information and Guidance. The training includes four definite objectives. The first embraces the fundamentals of general education: English, mathematics, sociology, history, and the natural sciences—biology, geology, chemistry, and physics. Next are the technical subjects selected according to the professional course of the student: for Agricultural Teaching, in the School of Agriculture; for Industrial Arts and Industrial Education, in the School of Engineering. In the third group are the principles and methods of teaching and of vocational guidance. Educational Psychology here is obviously essential. The last objective is practical experience. To meet the requirements of the State Department of Public Instruction for teaching certificates, students, before graduation, observe and teach under the direction of

\* On military leave.

the faculty of the Division in selected high schools. Moreover, experience in the respective occupations is required for those preparing to teach agriculture, and the trades and industries.

**Psychology.**—General Psychology, giving an understanding of man's reactions to individual and social forces, constitutes one of the fundamentals of liberal education. Educational Psychology, applying the general principles to the problems of instruction, learning, and character building, becomes obviously essential in the equipment of teachers. Courses in Applied, Industrial, and Social Psychology of specialized nature meet the needs of the various technological curricula. The Department of Psychology, in view of its intimate relation to the problems of teacher education, is incorporated administratively in the Division of Teacher Education; at the same time it functions instructionally throughout the Basic Division and the Professional Schools.

**Requirements for Graduation.**—For graduation in the Division of Teacher Education, the scholastic requirement in all curricula is the satisfactory attainment of at least 230 term credits with not fewer than an equal number of honor points.

Of the term credits required for graduation, a student must have at least 27 in Education, 18 in Language, 18 in the Natural Sciences, 18 in Social Science, 12 in Military Training or alternatives, 6 in Physical Education. Subjects must be taken as indicated in the several curricula.

Students who enter with advanced standing are allowed one point for each term credit accepted.

Further requirements consist of practice teaching in the subject and practical experience in the work to be taught as indicated above or under the several Departments.

**Degrees.**—Upon the satisfactory completion of one of the curricula in Education, a student is awarded the degree of Bachelor of Science with the name of his special curriculum appended: in Agricultural Education, in Industrial Arts Education, in Industrial Education, in Occupational Information and Guidance.

The Graduate Division of State College offers the Master's Degree to mature students of superior ability upon successful completion of its requirements. For the details, see the statement of the Graduate Division in this Catalog.

### Agricultural Education

Leon E. Cook

**Object.**—Agricultural Education is designed to prepare students for positions as teachers of vocational agriculture in the high schools of the State, and to qualify as such under the provisions of the Smith-Hughes and the George-Deen Acts of Congress.

The curriculum is comprehensive in nature. It is, of course, essential that teachers have a good foundation in English and in the sciences basic to an

understanding of agriculture. They should also have a sufficient understanding of the social sciences to appreciate the development of contemporary life, with the emphasis on those having to do with agriculture and the rural community. Manifestly they should have a grasp of agriculture in all phases of importance in the State, including the improvement of the farm home and of the social as well as of the economic development of the rural community. Proficiency in teaching vocational agriculture depends upon comprehensive and thorough preparation in the professional field with emphasis on personal relations and guidance, procedure in teaching both youth and adults, and in handling the various responsibilities of community service.

An adequate background of farm experience is essential for students looking forward to agricultural teaching, and experience in fields related to farming is desirable. A student should be farm-reared or should have several years of farm experience as a part of his preparation for teaching vocational agriculture.

**Placement of Graduates.**—There has been a strong demand for teachers of vocational agriculture with little difficulty in placing students who are qualified from the standpoint of personality, character, training, and farm experience. A coöperative arrangement with the supervisory staff in agricultural education of the State Department of Public Instruction facilitates the placement of students in situations adapted to their experience and training.

Successful teachers of agriculture are in demand for higher positions in the educational service and by other agencies for positions offering higher salaries than those paid in the teaching profession.

**Graduate Study.**—The Department provides opportunities for students, fully qualified, to do graduate work in Agricultural Education. Graduate students taking majors in this field should have completed the undergraduate work in Agricultural Education or the equivalent. Transfer students, or graduates in general agriculture who did not take the work in education, are required to complete 15 credits in education including Principles of Teaching and Methods of Teaching Agriculture, as prerequisites to graduate study.

## CURRICULUM FOR TEACHERS OF AGRICULTURE

### Freshman Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Composition, Eng. 101, 102, 103 . . . . .	3	3	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
General Botany, Bot. 102 . . . . .	0	4	0
General Zoology, Zool. 101 . . . . .	4	0	0
Algebra and Trigonometry, Math. 111, 112 . . . . .	0	4	4
Economic History, Hist. 101, 102, 103 . . . . .	3	3	3
Physical Geology, Geol. 120 . . . . .	0	0	4
†Military Science I, Mil. 101, 102, 103 . . . . .	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103 . . . . .	1	1	1
	17	21	21

† Or six credits in one or two of the following Departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology, and Ethics and Religion.

## Sophomore Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Farm Equipment, Agr. Eng. 202 . . . . .	0	3	0
Soils, Soils 201 . . . . .	5	0	0
General Economics, Econ. 201, 202 . . . . .	3	3	0
Agricultural Economics, Agr. Econ. 202 . . . . .	0	0	3
Physics for Agr. Students, Phys. 115 . . . . .	0	5	0
Animal Physiology, Zool. 202, or Plant Physiology, Bot. 221 . . . . .	0	0	5
Economic Zoology, Zool. 102 . . . . .	0	4	0
General Botany, Bot. 101 . . . . .	4	0	0
Introduction to Organic Chemistry, Chem. 221 . . . . .	0	0	4
Animal Nutrition I, A.H. 202 . . . . .	0	3	0
General Poultry, Pou. 201 . . . . .	3	0	0
Principles of Forestry, For. 111 . . . . .	3	0	0
General Horticulture, Hort. 203 . . . . .	0	0	3
General Field Crops, F.C. 202 . . . . .	0	0	3
†Military Science II, Mil. 201, 202, 203 . . . . .	2	2	2
Sport Activities, P.E. 201, 202, 203 . . . . .	1	1	1
	—	—	—
	21	21	21

## Junior Year

English, elective . . . . .	3	0	3
Educational Psychology, Ed. 303, 304 . . . . .	3	3	0
Visual Aids, Ed. 308 . . . . .	0	0	3
Teaching Farm Shop Work, Agr. Eng. 331, 332 . . . . .	3	3	0
Farm Management, Agr. Econ. 303 . . . . .	0	0	3
Farm Accounting, Agr. Econ. 313 . . . . .	0	0	3
Fertilizers, Soils 302 . . . . .	0	3	0
Rural Sociology, Rural Soc. 302 . . . . .	0	3	0
*Diseases of Field Crops, Bot. 301 . . . . .	3	0	0
**Economic Entomology, Zool. 213 . . . . .	0	0	4
***Electives . . . . .	8	8	3
	—	—	—
	20	20	19

## Senior Year

English, elective . . . . .	0	0	3
Materials and Methods in Teaching Agriculture, Ed. 412 . . . . .	0	5	0
Secondary Education in Agriculture, Ed. 426 . . . . .	0	0	3
Principles of Teaching, Ed. 406 . . . . .	3	0	0
Observations and Directed Teaching, Ed. 408 . . . . .	0	5	0
Methods of Teaching Agriculture, Ed. 407 . . . . .	5	0	0
Evening Classes and Directed Teaching, Ed. 411 . . . . .	0	5	0
****Animal Hygiene and Sanitation, A.H. 353 . . . . .	0	0	3
Agricultural Marketing, Agr. Econ. 411 . . . . .	3	0	0
***Electives . . . . .	4	3	7
	—	—	—
	15	18	16

\* Diseases of Fruits and Vegetable Crops, Bot. 303, may be substituted for Bot. 301.

\*\* General Bacteriology, Bot. 402, or Genetics, Zool. 411, may be substituted for Economic Entomology, Zool. 213.

\*\*\* Options and electives except Mil. Science III and IV must be chosen with the approval of the adviser.

\*\*\*\* Common Diseases, A.H. 352, may be substituted for A.H. 353.

† Or six credits in one or two of the following Departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology, and Ethics and Religion.

**INDUSTRIAL ARTS EDUCATION**

John R. Ludington

Industrial Arts comprises that area of study and experience which deals with industry as a unit of society and the manner in which industry and its related materials, processes, and problems affects and has affected other units of society. For many years North Carolina State College has had an important part in aiding individuals and groups of individuals to cope with the increasingly complex problems of living in an industrial society through its program of teacher education.

The demand for competent teachers of Industrial Arts has increased year after year and the need for Industrial Arts as an essential phase of general education at the elementary and secondary school levels is being realized by progressive school communities and leaders in education.

**Purposes.**—The Department of Industrial Arts is organized to aid in the education of teachers and supervisors of Industrial Arts, and to provide experiences for those individuals who desire to deal more appreciatively and effectively with problems of living in a democratic-industrial society. The successful completion of this curriculum leads to the granting of the degree of Bachelor of Science in Industrial Arts Education and the fulfillment of requirements for an A-grade certificate for teaching in this field.

The first two years of work in this curriculum are in line with the Basic Division of the College, which emphasizes work of a general and foundational nature. The junior and senior years are planned to include experiences of a specialized-professional nature.

In addition to added faculty personnel, new facilities have been provided in the Department which include: laboratories, machines, tools, benches, classrooms, and library resources. Further increases in physical setting and equipment have been planned which will make North Carolina State College one of the leading Industrial Arts teacher-education centers in the Southeast.

**Graduate Program.**—Opportunities are provided for students of demonstrated interest and ability to do graduate work leading to the Master's Degree. The faculty personnel and resources of the Greater University of North Carolina are used in planning a sequence of experiences on the graduate level to meet the individual interests and needs of persons interested in Industrial Arts Education. Persons interested in graduate work in this field are invited to write for detailed information and courses offered.

**DIVISION OF TEACHER EDUCATION**  
**CURRICULUM FOR TEACHERS OF INDUSTRIAL ARTS**

**Freshman Year**

COURSES	CREDITS		
	First Term	Second Term	Third Term
Composition, Eng. 101, 102, 103 .....	3	3	3
Algebra, Trigonometry, and Mathematics of Finance .....			
Math. 111, 112, 113 .....	4	4	4
General Chemistry, Chem. 101, 102, 103 .....	4	4	4
Industrial Arts Drawing, Ed. (I. A.) 105a, b, c .....	3	3	3
Industrial Arts, Ed. (I. A.) 106 a, b, c .....	3	3	3
Military Science I, Mil. 101, 102, 103 or World History, Hist. 104 .....	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103 .....	1	1	1
	—	—	—
	20	20	20

**Sophomore Year**

Business English, Eng. 211, Public Speaking, Eng. 231, Elective English .....	3	3	3
General Physics, Phys. 105, 106, 107 .....	4	4	4
Economic History, Hist. 101, 102, 103 .....	3	3	3
Industrial Arts Design, Ed. (I. A.) 205 .....	0	0	3
General Sociology, Soc. 202, 203 .....	3	3	0
Laboratory Problems in Industrial Arts, Ed. 206 (I. A.) a, b, c .....	3	3	3
†Military Science II, Mil. 201, 202, 203 .....	2	2	2
Sports Activities, P.E. 201, 202, 203 .....	1	1	1
	—	—	—
	19	19	19

**Junior Year**

Introduction to Psychology, Psychol. 200, Educational Psychology, Ed. 304, Psychology of Adolescence, Ed. 476 .....	3	3	3
General Economics, Econ. 201, 202, 203 .....	3	3	3
Problems in Secondary Education, Ed. 344, Field Work in Secondary Education, Ed. 433, Visual Aids, Ed. 308 .....	3	3	3
Laboratory Problems in Industrial Arts, Ed. 306 (I. A.) a, b, c .....	3	3	3
Business Law, Econ. 307 .....	3	0	0
*Electives .....	3	3	3
*Electives in Related Technical and Shop Courses .....	3	5	3
	—	—	—
	21	20	18

**Senior Year**

Methods of Teaching Industrial Ed. 422, Observation and Directed Teaching, Ed. 444 .....	3	3	3
Labor Problems, Econ. 331, Vocational Guidance, Ed. 420 .....	3	3	0
Occupational Studies, Ed. 424 .....	0	0	3
Curriculum Problems in Industrial Arts, Ed. 482, In- structional Aids and Devices, Ed. 483, Laboratory Planning and Equipment Selection, Ed. 484 .....	3	3	3
**Electives .....	3	3	3
*Electives in Related Technical and Shop Courses .....	6	6	6
	—	—	—
	18	18	18

\* Electives to be selected with aid of adviser to meet special needs of individual students.

† Or six credits in one or two of the following departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology, and Ethics and Religion.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science and Social Science.

## OCCUPATIONAL INFORMATION AND GUIDANCE

Edward W. Boshart

**Objective.**—Guidance is becoming a more important part of the preparation for the high office of teaching. Pupils of all ages are in need of assistance in meeting all sorts of life problems, such as those of education, vocation, health, and emotional stability. Each level of school development—elementary, junior high, senior high, and college—requires particular attention in which the teacher's advice is essential. In addition to the work of the classroom teacher, there is need of continued service in the form of general direction in supplying needed materials, suitable programs, general oversight of plans, and care of special cases requiring the attention of one with wide experience.

Through subject matter courses, including exploration, tests and measurements, the requirements of various trades, occupations, and professions, State College is endeavoring to prepare individuals to become teachers of occupational information and to serve as counselors of students in leading them through their choice of studies and vocational interests toward successful and happy living. It is essential that counselors have an adequate background of teaching experience, as well as acquaintance with occupational problems; therefore, it is essential to the preparation of individuals for this work that they qualify to teach classes in occupations as related to the world about them, and thereby develop themselves for the position of counselors and directors of this work.

**Organization.**—The courses selected for this curriculum have as their objective the broadening of experience and acquaintance with the whole field of education and will lead toward the degree of Bachelor of Science in Occupational Information and Guidance. Throughout this period of preparation the emphasis will be on a thorough acquaintance with the work outlined, together with a selected minor in social sciences or natural sciences.

The first two years of this curriculum are in line with the general plan of the College which emphasizes work of fundamental value. The last two years are given to work of a professional and specialized nature stressing analysis of occupations and trades, guidance programs, organization and administration.

**Placement of Graduates.**—There is a growing demand for teachers of occupational information and guidance. In a few instances the full time of one or more instructors will be taken up in giving occupational information and performing other guidance functions. In the smaller schools where the full time is not thus used, the teacher will be required to hold other classes and should be prepared in some related field.

**Graduate Study.**—This Department offers opportunity for those who have had experience in teaching to prepare for a position as counselor or director of guidance. This study leads toward the earning of the degree of

Master of Science in Education and may be accomplished through a year or more in residence or through the offerings of our Summer School Sessions. A prerequisite for work in the graduate field should be one or more years of teaching experience, a particular interest in the field, and a rather wide acquaintance with social and economic problems.

### CURRICULUM FOR TEACHERS OF OCCUPATIONAL INFORMATION AND GUIDANCE

#### Freshman Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Composition, Eng. 101, 102, 103	3	3	3
Algebra, Trigonometry, Mathematics of Finance,			
Math. 111, 112, 113	4	4	4
Science (selected with aid of adviser)	4	4	4
Economic History, Hist. 101, 102, 103	3	3	3
Occupations, Ed. 103	0	0	3
General Sociology, Soc. 202, 203	3	3	0
Military Science I, Mil. 101, 102, 103 or			
World History, Hist. 104	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103	1	1	1
	—	—	—
	20	20	20

#### Sophomore Year

Business English, Eng. 211, Public Speaking, Eng. 231,			
Elective English	3	3	3
Science (selected with aid of adviser)	4	4	4
General Economics, Econ. 201, 202, 203	3	3	3
History of United States, Hist. 201, 202, 203	3	3	3
†Military Science II, Mil. 201, 202, 203	2	2	2
Sports Activities, P.E. 201, 202, 203	1	1	1
**Electives	3	3	3
	—	—	—
	19	19	19

#### Junior Year

English or Modern Language	3	3	3
Introduction to Psychology, Psychol. 200, Educational Psychology, Ed. 304, Psychology of Adolescence, Ed. 476	3	3	3
Problems in Secondary Education, Ed. 344, Field Work in Secondary Education, Ed. 433, Visual Aids, Ed. 308	3	3	3
‡American Government, Pol. Sci. 200, 201, 202	3	3	3
**Electives	3	3	3
*Electives	6	5	3
	—	—	—
	21	20	18

#### Senior Year

Methods of Teaching Occupations, Ed. 423	3	0	0
Observation and Directed Teaching, Ed. 444	0	3	3
Philosophy of Guidance, Ed. 420	3	0	0
Social Recreation, P.E. 401	0	0	3
Psycho-diagnostic Techniques, Psy. 470, 471, 472	3	3	3
Occupational Studies, Ed. 424	0	0	4
**Electives	3	3	3
*Electives in related courses	6	9	3
	—	—	—
	18	18	18

\* Electives to be selected with aid of adviser to meet special needs of individual student.

† Political Science 203 may alternate with Political Science 200.

‡ Or six credits in one or two of the following departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology, and Ethics and Religion.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science and Social Science.

**Industrial Education****J. Warren Smith**

**Object.**—In a greater degree than at any previous time, thought is now directed toward an extended program of trade-shop courses in Industrial Education for North Carolina high schools. Some of the causes of this focus of attention are: increased production for War purposes, rising age for entrance to work, increasing school enrollment, and an extended school term. It is to prepare teachers for this field of service that this program is designed. A four-year course is outlined with the first two years running parallel with that of Industrial Arts, then specializing by following the outlined course during the last two years.

**Positions for Graduates.**—The student who completes this course will be prepared to teach in the all-day schools or the part-time or the evening classes, such as are supported by State and Federal funds for vocational education. At the present time, little difficulty should be encountered by the successful candidates in attaining positions after graduation.

**Journeyman Experience Required.**—Candidates for degrees must have had at least two years of successful journeyman experience in the trade they wish to teach. Successful completion of this course leads to the degree of Bachelor of Science in Industrial Education. Men with journeymen experience who desire to take only professional courses, may enter as special students with the object of completing one or two years of training as outlined for the junior and senior years. For this work, no degree would be granted.

This Department is recognized as the official Training Department of Industrial Education for the State Department of Education. The head of the Department serves as itinerant teacher-trainer for part-time, day-trade, and evening classes, and for the preparation of prospective teachers.

For the time being, the services of the Head of this Department will be devoted largely to itinerant-teacher training. However, as the demand for resident courses at State College designed to prepare shop teachers develops, the schedule can be adjusted to meet this demand.

## CURRICULUM FOR TEACHERS OF INDUSTRIAL EDUCATION

For freshman and sophomore years, see Industrial Arts Education

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Philosophy of Industrial Education, Ed. 427 . . . . .	0	3	0
*Shopwork (selected) . . . . .	3	3	3
Introduction to Psychology, Psychol. 200, Educational Psychology, Ed. 304, Psychology of Adolescence, Ed. 476 . . . . .	3	3	3
Philosophy of Guidance, Ed. 420 . . . . .	0	0	3
Problems in Secondary Education, Ed. 344 . . . . .	3	0	0
Labor Problems, Econ. 331 . . . . .	3	0	0
General Sociology, Soc. 202, 203 . . . . .	3	3	0
Visual Aids, Ed. 308 . . . . .	0	0	3
Mechanical Drawing, M.E. 211, 212, 213 . . . . .	2	2	2
**Electives . . . . .	3	3	3
Electives . . . . .	0	3	2
	20	20	19

## Senior Year

Local Survey: Planning a Program, Ed. 416 . . . . .	0	3	0
*Shopwork (selected) . . . . .	0	3	0
Methods of Teaching Industrial Subjects, Ed. 422 . . . . .	3	0	0
Observation and Directed Teaching, Ed. 444 . . . . .	0	3	3
Occupational Studies, Ed. 424 . . . . .	0	0	3
Curriculum Problems in Industrial Arts, Ed. 482, Instructional Aids and Devices, Ed. 483, Laboratory Planning and Equipment Selection, Ed. 484 . . . . .	3	3	3
***Elective courses in Design . . . . .	3	3	3
**Electives . . . . .	3	3	3
Electives . . . . .	5	0	3
	17	18	18

\* Elective shopwork should be taken in fields available as Textiles, Woodshop, Machine Shop, Foundry, and Electricity.

\*\* To be selected from the following fields: Humanities, Military Science III and IV, Language and Literature, Pure Mathematics, Pure Natural Science and Social Science.

\*\*\* Elective courses must be approved by the faculty adviser.

## THE SCHOOL OF TEXTILES

Malcolm E. Campbell, Dean and Director of Textile Research  
Thomas Nelson, Dean Emeritus

**Organization.**—The School of Textiles of North Carolina State College is organized for the purpose of administration into four departments: Yarn Manufacturing and Knitting, Weaving and Designing, Textile Chemistry and Dyeing, Textile Research.

The School of Textiles is organized to offer technical instruction, both undergraduate and graduate, in the production and finishing of textile products. It is also organized and equipped to conduct fundamental textile research and coöperates with other Schools of the College and with research organizations throughout the country.

**Purpose.**—The purpose of the School of Textiles is to educate men for professional service in Textile Manufacturing, Textile Management, Textile Chemistry and Dyeing, Yarn Manufacturing, Knitting, Weaving and Designing; to develop their capacities for intelligent leadership; to equip them to participate in commercial and public affairs; to aid in the development of the textile industry and its commerce through research and experimentation; to coöperate with the textile mills of the State in gaining, through scientific research, information that will improve the quality and value of manufactured products and increase technical skill.

**Occupations.**—Never before in America have more opportunities in textiles been offered to young people of North Carolina and the South generally than are available today to graduates of the School of Textiles.

North Carolina is the largest textile manufacturing State in the South; it has more mills than any other State in America. It has the largest towel, damask, denim, and underwear mills in America; and it has more mills that dye and finish their own products than any other Southern State, also a large printing industry. These plants produce a diversified line of cotton, rayon, silk, wool, and worsted textile products.

The courses of instruction are arranged and grouped so that students may get the best results from their work, and accumulate the necessary knowledge, which, together with actual experience after graduation, enables them to fill such positions as the following:

Owners of mills.

Presidents and vice-presidents of mills and other textile establishments.

Secretaries and treasurers of mills.

Managers, superintendents, and department foremen in cotton, rayon, woolen, silk, and hosiery mills.

Superintendents and foremen in mercerizing, bleaching, dyeing, and finishing plants.

Designers and analysts of fabrics.  
Technical demonstrators in the dyestuff industry.  
Textile chemists.  
Textile cost accountants in mills.  
Purchasing agents for mills.  
Salesmen of machinery, yarn, cloth, rayon, dyestuffs, and chemicals.  
Positions in yarn and fabric commission houses, with fabric converters and with research organizations.  
Specialists in Government service.  
Representatives for manufacturers of machinery, rayon, dyestuffs, and mill supplies.

**Degrees.**—Upon the completion of any one of the curricula in Textiles the degree of Bachelor of Science in Textiles is conferred.

The degree of Master of Science in Textiles is offered for the satisfactory completion of one year of graduate study in residence. Candidates for the degree of Master of Science in Textiles enter and are enrolled in the Graduate Division of the College.

The professional degree of Master of Textiles may be conferred upon graduates of the School of Textiles after five years of professional practice in charge of important work and upon the acceptance of a satisfactory thesis.

**Requirements.**—The requirements for graduation in the School of Textiles are the satisfactory completion of all the courses in one of the prescribed curricula on the pages following, a total of not fewer than 230 term credits, with not fewer than 230 honor points.

Of the minimum of 230 term credits required for graduation in the School of Textiles, 144 are common to all curricula; that is, 12 term credits in Mathematics, 18 in Language, 27 in Economics and history, 12 in Chemistry, 15 in Physics, 12 in Engineering, 6 in Agriculture, 24 in General Textiles, 12 in Military Training or Social Science alternatives, and 6 in Physical Education. Each of the curricula permits election of 18 term credits.

**Inspection Trip.**—Each student is required to make an inspection trip during his senior year to mills making various classes of fabrics, also to bleaching, dyeing, finishing, and hosiery plants. The trips are made in chartered busses.

**Curricula.**—The freshman and sophomore work is the same for all students in the School of Textiles. The training is general, and gives the student a good opportunity to make a wise choice in the selection of the particular field in which he desires to specialize. Five curricula are offered.

1. Textile Manufacturing
2. Textile Management
3. Textile Chemistry and Dyeing
4. Weaving and Designing
5. Yarn Manufacturing

Textile Manufacturing and Textile Management offer work in all Departments of the School of Textiles; these are therefore general curricula with one placing more emphasis on manufacturing, the other, more emphasis on economics.

Students who select Textile Chemistry and Dyeing, Weaving and Designing, or Yarn Manufacturing devote a larger percentage of their time to specialization in one Department of the School of Textiles.

**Textile Curricula for University and College Graduates.** Selected courses leading to the degree Bachelor of Science in Textiles are offered to graduates of universities and standard colleges. These are arranged in accordance with the vocational aim of the individual student and in the light of credits presented from the institution by which the student has been graduated, subject to the approval of his adviser and the director of instruction. In cases where the student presents enough credits which may be used for courses required in a curriculum, he or she may be graduated with a Bachelor of Science degree in Textiles within one year. In no case should it take more than two years to complete the work for the degree.

**Short Course for Textile Mill Men.**—Instruction in yarn manufacturing, weaving, designing, fabric analysis, and dyeing, lasting two weeks in the second term, is offered for textile mill men who wish to make a short and intensive study of any of these subjects. The subject matter will be selected to suit the requirements of each individual.

### **Yarn Manufacturing and Knitting**

Professor Elliot B. Grover, Head of the Department

Professor J. T. Hilton

Associate Professor J. G. Lewis;\* Assistant Professor G. R. Culberson

**Purpose.**—The purpose of this Department is to instruct students in the theory and practice of producing yarns and hosiery; to coöperate with mills in solving manufacturing problems through research and experimentation; and to manufacture the yarns used in the weave room. This Department is located on the top of the Textile Building.

**Opening and Picking.**—The opening and picking equipment is placed in a separate room and consists of bale breaker, vertical opener, C.O.B. and condenser, breaker picker, and finisher lapper.

**Carding and Spinning.**—This equipment occupies two rooms. The larger one is used for instruction. The machinery consists of cards, regular and controlled-draft drawing frames, fly frames, spinning frames, warper, spooler, winders, regular and fancy twisters, and a complete unit of combing machinery for the production of fine yarns. The smaller room contains a complete unit of carding and spinning machinery, including several types of long-draft spinning; it is used as an experimental laboratory. Thus student instruction and experimental work do not conflict. Both rooms are equipped with Parks-Cramer humidifiers.

\* On military leave.

**Woolen.**—This equipment, placed in a separate room on the basement floor, consists of a complete woolen unit made by Davis and Furber, and a Universal winder.

**Knitting.**—This department is equipped with a variety of circular knitting machines for making children's hose, ladies' hose, and men's plain and fancy half hose. It is also equipped with a Wildman single head, single unit full-fashioned hosiery machine, Merrow sewing machine, loopers, bottle bobbin winder, Universal winder and balances.

**Research Laboratory.**—This laboratory is set up and equipped for the performance of physical tests on fibers, yarns, and fabrics. It has the most modern type of air conditioning designed specifically for the control of the dry bulb temperature and relative humidity within close tolerances and over a wide range of conditions.

This laboratory is used for teaching, physical testing and research.

Included in the laboratory equipment are the following: Suter-Webb fiber sorter, Pressley fiber strength instrument, several tension and other types of balances, several combination skein and cloth breaking machines, inclined plane testers, single strand testers, Moscrop multiple and single strand tester, Mullen bursting strength tester, dry-ovens, abrasion machines, twist testers, densometers, hydrostatic pressure tester, microscopic equipment, automatic reels, yarn quadrants, and many other types of laboratory equipment.

The curriculum in Yarn Manufacture is listed with the other Textile curricula.

### Weaving and Designing

Professor T. R. Hart, Head of the Department

Professors Thomas Nelson, W. E. Shinn

\*Assistant Professor J. A. Porter, Jr.

\*Instructor, W. E. Moser

**Purpose.**—The purpose of this Department is to instruct students in the theory and practice of weaving and designing fabrics ranging from simple print cloths to elaborate leno and jacquard creations, to coöperate with the home economics department of North Carolina colleges in creating consumer interest in textile products, to coöperate with mills in solving manufacturing problems through research and experimentation. This Department is located on the second floor of the Textile Building.

**Weave Room.**—This room contains a larger variety of looms than can be found in any textile mill. These have been carefully selected so that the students may obtain a knowledge of the different cotton, rayon, and silk looms made in the United States. It also contains looms to produce such fabrics as print cloths, sheetings, denims and twill fabrics, ginghams, fancy shirtings, dress goods, and plush, as well as fancy leno and jacquard fabrics. The weave room has been modernized so that the students can be trained in

\* On military leave.

the technique of manufacturing fancy cotton, rayon, and combination fabrics on automatic, dobby, and jacquard looms. Other equipment in the weave room includes Universal filling winders, braiders and Bahnsen humidifiers.

**Warp Preparation.**—Short warps in the School of Textiles are made on the silk and rayon equipment in this department, which consists of a silk and rayon skein winder, and a combination warper and beamer. Other equipment includes a slasher and cotton beaming frame.

**Designing and Fabric Analysis.**—A full equipment of design boards for single and double cloths is provided in the classrooms. Dies for cutting samples and different makes of balances, and microscopes are provided for the analysis of fabrics. Other designing equipment includes an enlarging camera, card cutting pianos and card lacing equipment.

The curriculum in Weaving and Designing is listed with the other Textile curricula.

### Textile Chemistry and Dyeing

Professor A. H. Grimshaw, Head of the Department  
Assistant Professor A. C. Hayes

**Purpose.**—The purpose of this Department is to instruct students in the theory and practice of dyeing, printing, and finishing yarns and fabrics; to conduct experiments; to coöperate with the mills of the State in solving problems relating to the dyeing and finishing of textile products; to dye the yarns used in the weave room to produce fabrics. This Department is located on the basement floor of the building.

**Equipment.**—The Dye Laboratory is fitted up with work tables, balances, steam baths, drying oven, and other apparatus for experimental dyeing, dye testing, color matching, and the testing of dyed samples by acids and alkalies. It also contains roller, spray, and screen printing apparatus.

The Dye House is equipped with kier; raw stock, package, skein, and hosiery dyeing machines; a cloth dyeing machine of the creel type; hydro-extractor; raw stock dryer and other equipment needed in the dyeing of larger quantities of material and in giving instruction in boiling out, bleaching, and dyeing raw stock, skeins, warps, hosiery, and piece goods.

The Research Laboratory contains microscopes, photo-micrographic cameras and projector, fade-ometer, launder-ometer, pH apparatus, viscometers, extractors, separator, analytical balances, electric oven, equipment for testing oil and finishing compounds, as well as the analytical equipment generally used by textile chemists. It also contains a dark room fully equipped for photographic work.

The curriculum in Textile Chemistry and Dyeing is listed with the other Textile curricula.

## Textile Research

Malcolm E. Campbell, Director  
George H. Dunlap, Technologist

Members of the School of Textiles staff devote a considerable portion of their time each year to problems of applied research submitted to the School by mills. Emphasis is given to the practical aspects of such work, in order that the results may be of immediate value to the mills.

It is the function of the Technologist to visit as many mills as possible during the year, to discuss their technical problems and whenever possible to assist them in planning and setting up research projects in the mills. Also, he frequently brings back to the School technical problems which can be answered either through consultation with the staff or through special work in the laboratories of the School.

Under terms of a special agreement with the Textile Research Institute, Inc., and the War Production Board, a research project is now under way, the purpose of which is to investigate and recommend ways and means of increasing the production of cotton carding machines with a minimum of damage to the product.

The equipment available for research is listed under the Departments.

## CURRICULUM IN TEXTILE MANUFACTURING

## \*Freshman Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
Composition, Eng. 101, 102, 103 . . . . .	3	3	3
Physics for Textile Students, Phys. 111, 112, 113 . . . . .	4	4	4
Algebra, Trigonometry, Mathematics of Finance, Math. 111, 112, 113 . . . . .	4	4	4
Shopwork, M.E. 121, 122, 123 . . . . .	1	1	1
Engineering Drawing I, M.E. 101, 102, 103 . . . . .	2	2	2
Textile Principles Lab., Tex. 101, 102, 103 . . . . .	1	1	1
Yarn Calculations, Tex. 105 . . . . .	1	0	0
Cloth Calculations, Tex. 131 . . . . .	0	0	2
Military Science I, Mil. 101, 102, 103 or World History, Hist. 104 . . . . .	2	2	2
Fundamental Activities and Hygiene, P.E. 101, 102, 103 . . . . .	1	1	1
	19	18	20

## \*Sophomore Year

Economic History, Hist. 101, 102, 103 . . . . .	3	3	3
Decorative Drawing, Arch. 106, or Light in Industry, Phys. 311 . . . . .	3	0	0
Light in Industry, Phys. 311, or Decorative Drawing, Arch. 106 . . . . .	0	0	3
General Inorganic Chemistry, Chem. 101, 102, 103 . . . . .	4	4	4
English or Modern Language . . . . .	0	3	3
Yarn Manufacture I, Tex. 201, 202, 205 . . . . .	1	1	3
Power Weaving, Tex. 231, 232, 234 . . . . .	1	3	0
Fabric Structure and Analysis, Tex. 235, 236 . . . . .	2	2	0
Knitting I, Tex. 207, 208, 209, 211 . . . . .	3	1	1
†Military Science II, Mil. 201, 202, 203 . . . . .	2	2	2
Sports Activities, P.E. 201, 202, 203 . . . . .	1	1	1
	20	20	20

\* Freshman and sophomore years for all Textile curricula.

† Or six credits in one or two of the following departments: Economics, Psychology, History and Political Science, Modern Languages, Sociology.

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
English or Modern Language .....	3	0	0
General Economics, Econ. 201, 202, 203 .....	3	3	3
Textile Calculations I, Tex. 345 .....	0	0	3
Yarn Manufacture II, Tex. 301, 302, 303, 304 .....	1	4	1
Dobby Weaving, Tex. 331, 332, 333, 335 .....	1	1	4
Fabric Design and Analysis I, Tex. 341, 342 .....	3	3	0
Dyeing I, Tex. 371, 372, 373, 375 .....	4	1	1
Fabric Testing, Tex. 343 .....	0	0	1
Cotton Quality I & II, Tex. 420, 421 .....	0	3	3
Electives .....	3	3	3
	18	18	19

## Senior Year

Industrial Management, Personnel Management, Econ. 325, 326, 333 .....	3	3	3
**Introduction to Psychology, Psychol. 200 .....	3	0	0
**Applied Psychology, Psychol. 337 .....	0	3	0
**Industrial Psychology, Psychol. 338 .....	0	0	3
Yarn Manufacture IV, Tex. 401, 402, 403, 405 .....	4	1	1
Leno Design, Tex. 441 .....	3	0	0
Dobby Design, Tex. 443 .....	0	3	0
Jacquard Design, Tex. 445 .....	0	0	3
Cotton and Rayon Weaving, Tex. 431, 432, 435 .....	1	1	3
Cotton and Rayon Dyeing I, Tex. 471, 472, 473, 474 .....	1	4	1
Fabric Analysis, Tex. 451, 452 .....	2	2	0
Textile Microscopy I, Tex. 475 .....	0	0	1
Electives .....	3	3	3
	20	20	18

\*\* Principles of Accounting, Econ. 301, 302, 303, may be substituted for Psychology 200, 337, 338.

## CURRICULUM IN TEXTILE CHEMISTRY AND DYEING

The freshman and sophomore years are the same as for Textile Manufacturing.

## Junior Year

English or German .....	3	0	0
General Economics, Econ. 201, 202, 203 .....	3	3	3
Introduction to Psychology, Psychol. 200, or Textile course .....	0	0	3
Qualitative and Quantitative Analysis, Chem. 211, 212, 223 .....	4	4	4
Dyeing II, Tex. 377, 378, 379, 381, 382 .....	5	5	2
Fabric Testing, Tex. 343 .....	0	0	1
Cotton Quality I & II, Tex. 420, 421 .....	0	3	3
Electives .....	3	3	3
	18	18	19

## Senior Year

Industrial Management, Personnel Management, Econ. 325, 326, 333 .....	3	3	3
Organic Chemistry, Chem. 421, 422, 423 .....	4	4	4
Applied Psychology, Psychol. 337, or Textile course .....	0	3	0
Industrial Psychology, Psychol. 338, or Textile course .....	0	0	3
Textile Microscopy II, Tex. 489, 490 .....	1	1	0
Textile Printing, Tex. 483, 484, 485, 487 .....	4	1	1
Cotton and Rayon Dyeing II, Tex. 477, 478, 479, 480, 481 .....	2	5	5
Electives .....	6	3	3
	20	20	19

## CURRICULUM IN YARN MANUFACTURING

The freshman and sophomore years are the same as for Textile Manufacturing.

## Junior Year

COURSES		CREDITS		
		First Term	Second Term	Third Term
English or Modern Language	.....	3	0	0
General Economics, Econ. 201, 202, 203	.....	3	3	3
Accounting I, Econ. 301, 302	.....	3	3	0
Yarn Manufacturing III, Tex. 310, 311	.....	0	3	3
Yarn Manufacturing Lab. III, Tex. 307, 308, 309	.....	2	2	2
Dobby Weaving, Tex. 331, 332, 333, 335	.....	1	1	4
Dyeing I, Tex. 371, 372, 373, 375	.....	4	1	1
Cotton Quality I & II, Tex. 420, 421	.....	0	3	3
Electives	.....	3	3	3
		—	19	19
			19	19

## Senior Year

Industrial Management, Personnel Management, Econ. 325, 326, 333	.....	3	3	3
Introduction to Psychology, Psychol. 200	.....	3	0	0
Applied Psychology, Psychol. 337	.....	0	3	0
Industrial Psychology, Psychol. 338	.....	0	0	3
Machine Shop II, M.E. 227, 228, 229	.....	1	1	1
Elements of Electrical Engineering I, E.E. 320, 321	.....	3	3	0
Textile Calculations II, Tex. 413	.....	3	0	0
Yarn Manufacturing V, Tex. 407, 408, 409, 411, 412	.....	5	5	2
Manufacturing Problems, Tex. 415	.....	0	0	3
Electives	.....	3	3	6
		—	21	18
			21	18

**CURRICULUM IN TEXTILE MANAGEMENT**

The freshman and sophomore years are the same as for Textile Manufacturing.

**Junior Year**

COURSES	CREDITS		
	First Term	Second Term	Third Term
English or Modern Language .....	3	0	0
Accounting I, Econ. 301, 302, 303 .....	3	3	3
General Economics, Econ. 201, 202, 203 .....	3	3	3
Yarn Manufacture II, Tex. 301, 302, 303, 304 .....	1	4	1
Cotton Quality I & II, Tex. 420, 421 .....	0	3	3
Fabric Testing, Tex. 343 .....	0	0	1
Textile courses .....	5	2	5
Electives .....	3	3	3
	18	18	19

**Senior Year**

Industrial Management, Personnel Management, Econ. 325, 326, 333 .....	3	3	3
Marketing Methods and Sales Management, Econ. 311, 312, 318 .....	3	3	3
Introduction to Psychology, Psychol. 200 .....	3	0	0
Applied Psychology, Psychol. 337 .....	0	3	0
Industrial Psychology, Psychol. 338 .....	0	0	3
Textile courses .....	8	8	7
Electives .....	3	3	3
	20	20	19

Textile courses to be selected from:

Fabric Design and Analysis I, Tex. 341, 342 .....	3	3	0
Dobby Weaving, Tex. 331, 332, 333, 335 .....	1	1	4
Dyeing, Tex. 371, 372, 373, 375 .....	4	1	1
Textile Calculations, 345 or 413 .....	3	or	3
Yarn Manufacture IV, Tex. 401, 402, 403, 405 .....	4	1	1
Leno Design, Tex. 441 .....	3	0	0
Dobby Design, Tex. 443 .....	0	3	0
Jacquard Design, Tex. 445 .....	0	0	3
Calculating Fabric Costs, Tex. 344 .....	0	3	0
Cotton and Rayon Weaving, Tex. 431, 432, 435 .....	1	1	3
Cotton and Rayon Dyeing, Tex. 471, 472, 473, 474 .....	1	4	1
Fabric Analysis, Tex. 451, 452 .....	2	2	0
Manufacturing Problems, Tex. 415 .....	0	0	3
Color in Woven Design, Tex. 455, 456 .....	3	3	0
Wool Manufacture, Tex. 416, 417, 418 .....	1	4	0
Textile Microscopy I, Tex. 475 .....	0	0	1
Textile Testing, Tex. 457, 8, 9 .....	1	1	1

## CURRICULUM IN WEAVING AND DESIGNING

The freshman and sophomore years are the same as for Textile Manufacturing.

## Junior Year

COURSES	CREDITS		
	First Term	Second Term	Third Term
English or Modern Language . . . . .	3	0	0
General Economics, Econ. 201, 202, 203 . . . . .	3	3	3
Appreciation of Fine Arts, Arch. 111, 112, or Textile courses . . . . .	3	3	0
Textile Calculations I, Tex. 345 . . . . .	0	0	3
Fabric Design and Analysis I, Tex. 341, 342 . . . . .	3	3	0
Jacquard Design, Tex. 445 . . . . .	0	0	3
Dobby Weaving, Tex. 335, 337, 338, 339 . . . . .	2	2	5
Fabric Testing, Tex. 343 . . . . .	0	0	1
Cotton Quality I & II, Tex. 420, 421 . . . . .	0	3	3
Electives . . . . .	3	3	3
	17	17	21

## Senior Year

Industrial Management, Personnel Management, Econ. 325, 326, 333 . . . . .	3	3	3
Introduction to Psychology, Psychol. 200 . . . . .	3	0	0
Applied Psychology, Psychol. 337 . . . . .	0	3	0
Industrial Psychology, Psychol. 338 . . . . .	0	0	3
Leno Design, Tex. 441 . . . . .	3	0	0
Dobby Design, Tex. 443 . . . . .	0	3	0
Textile Testing, Tex. 457, 8, 9 . . . . .	1	1	1
Jacquard Design Laboratory, Tex. 447, 448, 449 . . . . .	1	1	1
Cotton Rayon Weaving, Tex. 435, 437, 438, 439 . . . . .	2	2	4
Color in Woven Design, Tex. 455, 456 . . . . .	3	3	0
Fabric Analysis, Tex. 451, 452 . . . . .	2	2	0
Textile Microscopy I, Tex. 475 . . . . .	0	0	1
Electives . . . . .	3	3	3
	21	21	16

The Graduate School of the University of  
North Carolina

STATE COLLEGE DIVISION

William Whatley Pierson, Jr., Dean, Chapel Hill  
Zeno Payne Metcalf, Associate Dean of the Graduate School, Raleigh

GRADUATE FACULTY

Professors

D. B. Anderson, Ph.D.	Botany
L. D. Baver, Ph.D.	Agronomy
E. W. Boshart, M.A.	Teacher Education
C. H. Bostian, Ph.D.	Zoology
T. E. Browne, M.A.	Teacher Education
W. H. Browne, Jr., B.E.	Electrical Engineering
*J. D. Clark, M.A.	English
J. K. Coggin, M.S.	Teacher Education
N. W. Conner, M.S.	Engineering Mechanics
L. E. Cook, M.S.	Teacher Education
Gertrude M. Cox, M.S.	Experimental Statistics
R. W. Cummings, Ph.D.	Agronomy
R. S. Dearstyne, M.S.	Poultry
J. B. Derieux, Ph.D.	Physics
T. C. Doody, Ph.D.	Chemical Engineering
*H. A. Fisher, LL.D.	Mathematics
G. W. Forster, Ph.D.	Agricultural Economics
R. S. Fouraker, M.S.	Electrical Engineering
B. B. Fulton, Ph.D.	Entomology
M. E. Gardner, B.S.	Horticulture
†A. F. Greaves-Walker, D.Sc.	Ceramic Engineering
A. H. Grimshaw, M.S.	Textile Chemistry
F. M. Haig, M.S.	Animal Industry
C. H. Hamilton, Ph.D.	Rural Sociology
*T. P. Harrison, Ph.D., LL.D.	English
T. R. Hart, M.S.	Textiles
†*L. C. Hartley, Ph.D.	English
C. M. Heck, M.A.	Physics
J. T. Hilton, M.S.	Textiles
*L. E. Hinkle, D.S. es L.	Modern Language
E. G. Hoefer, M.E.	Mechanical Engineering
J. V. Hofmann, Ph.D.	Forestry
E. H. Hostetler, M.S.	Animal Industry
*A. I. Ladu, Ph.D.	English
†B. E. Lauer, Ph.D.	Chemical Engineering

\* Humanities group advisory and minors only.  
† On military leave.

†M. C. Leager, Ph.D.	Accounting and Statistics
J. E. Lear, E.E.	Electrical Engineering
S. G. Lehman, Ph.D.	Botany
J. R. Ludington, Ph.D.	Industrial Arts Education
J. F. Lutz, Ph.D.	Soils
C. L. Mann, C.E.	Civil Engineering
F. H. McCutcheon, Ph.D.	Zoölogy
G. K. Middleton, Ph.D.	Agronomy
T. B. Mitchell, D.Sc.	Zoölogy
*C. G. Mumford, Ph.D.	Mathematics
Thomas Nelson, D.Sc.	Textiles
E. E. Randolph, Ph.D.	Chemical Engineering
R. B. Rice, A.M.	Experimental Engineering
R. H. Ruffner, M.S.	Animal Husbandry
G. H. Satterfield, M.A.	Chemistry
W. E. Shinn, M.S.	Textiles
I. V. Shunk, Ph.D.	Botany
G. W. Smith, D.Sc.	Engineering Mechanics
J. W. Smith, M.S.	Teacher Education
R. O. Stevens, M.S.	Zoölogy
J. L. Stuckey, Ph.D.	Geology
W. G. Van Note, M.S.	Mechanical Engineering
L. L. Vaughan, M.E.	Mechanical Engineering
B. W. Wells, Ph.D.	Botany
L. F. Williams, Ph.D.	Chemistry
A. J. Wilson, Ph.D.	Chemistry
Sanford Winston, Ph.D.	Sociology
†L. Wyman, M.F.	Forestry

## Associate Professors

*S. T. Ballenger, A.M.	Modern Language
C. R. Bramer, E.M.	Civil Engineering
†R. R. Brown, M.S. in E.E.	Electrical Engineering
*R. C. Bullock, Ph.D.	Mathematics
†*J. W. Cell, Ph.D.	Mathematics
J. M. Clarkson, Ph.D.	Experimental Statistics
E. R. Collins, Ph.D.	Agronomy
*A. M. Fountain, Ph.D.	English
H. C. Gauger, M.S.	Poultry
R. E. L. Greene, Ph.D.	Agricultural Economics
†R. Harkema, Ph.D.	Zoölogy
F. W. Lancaster, B.S. in Ch.E.	Physics
†*J. Levine, Ph.D.	Mathematics
†W. McGehee, Ph.D.	Psychology
W. D. Miller, Ph.D.	Forestry

\* Humanities group advisory and minors only.

† On military leave.

‡ On leave.

*E. H. Paget, M.A.	English
W. A. Reid, Ph.D.	Chemistry
J. A. Rigney, M.S.	Agronomy
B. W. Smith, M.S.	Agronomy

#### Assistant Professors

M. F. Buell, Ph.D.	Botany
†J. M. Parker, III, Ph.D.	Geology
C. F. Smith, Ph.D.	Entomology
†L. A. Whitford, Ph.D.	Botany

#### Organization

**Purposes.**—Graduate Instruction at State College is organized to formulate and develop graduate study and research in the fields primarily of Agriculture, Engineering, and Textile Manufacturing, and in the training of teachers of these subjects. The urgent need for graduate instruction leading to research in these fields is recognized by the leaders in the occupations which depend upon the development of these branches of industry. State College, therefore, offers training for teachers, investigators, and leaders in Agriculture, Engineering, and Manufacturing. Moreover, unless graduate study and research in the technological and related fields are provided, the institutions of higher learning in this section of the country will look elsewhere for trained men, whereas there should be a fair balance of such men from every section of the country.

**Facilities.**—State College offers exceptional facilities and opportunities for research. The Agricultural Experiment Station of North Carolina, the Engineering Experiment Station, and the Research Laboratories of the Textile School are integral parts of the College. In the Textile School, besides the research carried on by regular members of the staff, the Bureau of Agricultural Economics and other Bureaus at Washington have, for some years, used the facilities of the School for special research. Graduate students have the advantages offered by all these agencies in addition to the regular laboratories used for instruction.

In its undeveloped resources and raw materials, as well as in its going concerns in business and industry, in its varied topography and products, North Carolina is a rich field for research. The State is already imbued with a spirit of progress stimulating to intellectual growth.

**Scholarships and Fellowships.**—The College offers annually graduate fellowships and a number of teaching and research fellowships. Besides these, special fellowships are supported by various commercial organizations.

**College Fellowships** give tuition and a stipend of \$450 an academic year, paid in nine equal installments, a month apart, beginning October 25. The holder of a fellowship may be required to render a maximum of ten hours a week of service to the Department in which he is specializing.

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\* Humanities group advisory and minors only.  
† On military leave.

Teaching and Research Fellowships give \$600 or more an academic year. The holder of one of these fellowships may not carry more than half of a full schedule of graduate studies. The rest of his time must be given to teaching in classroom or laboratory, or to research in one of the Experiment Stations.

The Honor Society of Phi Kappa Phi Fellowship, State College Chapter, offers \$50 annually, preferably to a member of the Society, to assist in promoting research, and advanced training of worthy students.

Special Fellowships have for some years been maintained by business or manufacturing organizations desirous of having research made on certain problems pertaining to their interest. Some organizations maintaining these scholarships have been the National Fertilizer Association, the N. V. Potash Export My., the American Cyanamids Company, the Superphosphate Institute, E. I. DuPont de Nemours and Company, the Niagara Sprayer and Chemical Company, Eli Lilly and Company, the American Potash Institute, and the Northwestern Yeast Company. The stipends afforded by these fellowships have varied from \$720 to \$1,500 for twelve months. It is hoped that some of these may be available every year.

## DEGREES

The degrees awarded by the Graduate Division of State College are either degrees in residence: Master of Science in some specialized branch of Agriculture, Education, Engineering, and Textiles; and the Master's degree in some profession related to the undergraduate work at State College; or Professional degrees in the fields of Agriculture, Engineering and Textiles.

A graduate student is expected to familiarize himself with the requirements for the degree for which he is a candidate and is held responsible for the fulfillment of these requirements. This applies to the last dates on which theses may be accepted, the dates for examination, the proper form for theses and all other matters regarding requirements for degrees.

### Degrees in Residence

#### Admission

1. A candidate for admission to graduate study must present an authorized transcript of his collegiate record as evidence that he holds a bachelor's degree for a four years' undergraduate course from a college whose standards are equivalent to those of State College.

2. All new graduate students must present to the Office of Registration written authorization from the Associate Dean of the Graduate School to enter the graduate school before permits to register can be given them.

3. Graduate students must file in the Office of Registration an application for admission before permits to register can be given them.

4. Official transcripts of undergraduate and graduate work taken at other institutions must be filed in the Office of Registration before the period of registration closes.

5. It should be clearly understood that admission to the Graduate Division does not necessarily admit a student to full graduate status. A student attains full graduate status only when he has fulfilled all the preliminary requirements of the degree which he seeks and the prerequisites of the department under whose direction he is pursuing graduate work.

Department prerequisites are determined jointly by the Administrative Board of the Graduate Division and the heads of the respective departments. In brief, it may be stated that such prerequisites usually consist of the equivalent of an undergraduate major.

6. A member of the senior class of State College may, upon the approval of the Associate Dean of the Graduate School, register for graduate courses to fill a roster of studies not to exceed eighteen credits for any term.

7. Members of the faculty of State College having a rank higher than that of instructor may not be considered as candidates for advanced degrees at this institution.

#### Master of Science Degree

The Master of Science Degree is awarded at State College after completion of a course of study in a specialized field related to Agriculture, Education, Engineering, or Textiles; demonstration of ability to read a modern foreign language; and completion of a satisfactory thesis and of comprehensive examinations in the chosen field of study.

The rules and requirements governing the degree of Master of Science are set forth in some detail in the following paragraphs.

In addition to complying with these purely mechanical requirements, the candidate for the Master of Science degree should understand something of the philosophy of graduate study. He is entering the field of research since he is engaged in a technical study of a single field of learning, and this study culminates in work upon a single problem, the subject of his thesis, in the solution of which he is required to give evidence of the mastery of graduate methods of investigations. He is concerned with the materials of learning, and with the organization and interpretation of these materials. Since the training is thought of as liberal, as great a latitude is permitted in the selection of courses as is compatible with the idea of a sharply defined field of major interest and with the requirement of interrelationship in the whole plan of study. The object is to make possible for the student a relative mastery of one of the applied sciences and to give him an introduction to critical scholarship and research methods. A beginning is made in the training of the specialist; hence the correlation of courses, the oral and written examinations, and the thesis. Since there are many possible combinations of courses, the method of administration provides for personal supervision of a student's work by a special committee.

Development of precision and method in investigation and the cultivation of power of criticism and evaluation of evidence, together with the enlarged mastery of the subject matter of a defined field, constitute a training of

indisputable value to the students who plan to enter the so-called learned professions or industry. Research is the way of progress in each activity.

Credits.—1. For the Master of Science degree forty-five term credits are required.

2. Not more than ten of the academic credits required for a graduate degree will be accepted from other institutions.

3. No graduate credit will be allowed for excess undergraduate credit from any other institution.

4. All work credited toward a degree in residence must be completed within six years.

Residence.—A candidate for a Master of Science degree is required to be in residence at the College, pursuing graduate work, one full academic year of three terms. The candidate is not permitted to take courses leading to forty-five credits in a shorter time.

Six summer schools of six weeks in residence at the College are sufficient to fulfill the residence requirement. By specific approval of the Associate Dean of the Graduate School one summer period may be spent away from the College if devoted to the preparation of the thesis required for graduation.

In special cases, it is possible for graduate students to secure permission from the Associate Dean of the Graduate School to do twelve weeks work during a summer session. Under these provisions a minimum of four summer sessions, two of twelve weeks and two of six weeks, are required for residence.

This does not mean that the work prescribed for each individual can always be completed in the minimum length of time. Inadequate preparation very frequently makes a longer period necessary. Part-time work during a regular term is evaluated on the basis of the amount of work carried.

Courses of Study.—As designated in the College Catalog under Description of Courses, the courses numbered 500 to 599 are for graduate students only, and those numbered 400 to 499 are for graduates and advanced undergraduates.

The program of the student shall contain at least twelve credits in courses of the 500 group. A maximum of 33 credits may be gained in the 400 group.

During the first term in residence the student's program will be made up by his adviser with the approval of the chief adviser of his School and the Associate Dean of the Graduate School. Thereafter, the selection of courses shall be made by the graduate student's Advisory Committee. These advisory committees shall be appointed by the Associate Dean of the Graduate School not later than the student's second term of residence.

All study plans are subject to the approval of the Administrative Board of the Graduate Division.

The advanced courses taken by a graduate student shall constitute a unified plan of study. The greater percentage of courses on a graduate student's program shall be in his major field and the electives shall have graduate relationship to the major field.

**Class Work.**—Since a graduate student is mature and has demonstrated his ability and earnestness, he is expected to assume greater individual responsibility and to work in a more comprehensive manner than the undergraduate student. However, in preparation, in attendance, and in all the routine of class work, the graduate student is subject to the regulations observed in other divisions of the College.

**Grades.**—A minimum grade of B must be made on all courses to obtain graduate credit.

**Language Requirements.**—1. A reading knowledge of at least one modern foreign language is required of candidates for the Master of Science degree. The knowledge will be tested by a special examination by the Modern Language Department.

2. A candidate for a Master of Science degree is presumed to have a mastery of technical writing. Students will be required to demonstrate this proficiency before they are admitted to candidacy for a degree.

**Thesis.**—1. A candidate for the Master of Science degree must prepare a thesis upon a subject, approved by his adviser, in the field of the student's special work. Two copies of the completed thesis must be presented to the Associate Dean of the Graduate School at least one month before the degree is awarded.

2. Detailed instruction in the writing of the thesis will be given to the student when he is admitted as a candidate for the degree.

3. In order to be approved, a thesis must be written in correct English and scholarly form. It must demonstrate the student's ability to handle original problems and the method of development must conform to the principles of the scientific method.

**Examinations.**—Candidates for the Master of Science degree must pass all required examinations in courses. In addition, two special examinations are required. The first of these, a written examination to determine the student's comprehension of his field, is to be set by the student's Advisory Committee and must be taken not earlier than the first month of the last quarter of residence. The second examination is oral and is especially designed for the defense of the thesis. These examinations are to be conducted by special committees appointed by the Associate Dean of the Graduate School and will be held after each committee member has examined the completed thesis.

These examinations must satisfy the committee which has charge of them that the candidate possesses such knowledge of his major and minor fields as may reasonably be expected, that he can draw upon his knowledge with promptness and accuracy, and that his thinking is not limited to the separate units represented by his courses.

The special committees on theses and on the examinations will report their recommendations to the Associate Dean of the Graduate School at least one week before the end of the last quarter of residence. If the candidate's record in these respects is satisfactory, and if he has complied with all of the

requirements for the degree, the Associate Dean of the Graduate School will report the student to the faculty for approval and recommendation to the Board of Trustees.

### Fees

The graduate student in residence will pay a \$2.00 registration fee for each registration, \$3.00 per credit hour for all courses scheduled and \$10.00 for his diploma.

### Master's Degree in a Professional Field

The Master's degree was established to meet the needs of those students who expect to terminate their graduate work at the end of one year of residence or its equivalent and whose needs are not fulfilled by the requirements of the Master of Science degree.

The candidate for this Master's degree must meet all the regulations of the Graduate Division for students in residence. In addition he must fulfill the following requirements:

**Course of Study.**—The program of study for the Master's degree in a professional field is to be composed of those courses which best fit the professional aims of the student. At least 9 term credits are to be chosen from the group of courses numbered 500 for graduates only and the remainder from the group numbered 400 for advanced undergraduates and graduates.

**Degrees.**—Examples of the types of degree that may be awarded upon the completion of the course of study in a professional field are:

- Master of Dairying
- Master of Civil Engineering
- Master of Vocational Education
- Master of Yarn Manufacturing

The chief characteristic of these degrees is that the changes made in requirements permit, in greater measure, the satisfaction of what are represented as professional needs than do the requirements for the conventional Master of Science degree. The most important modification in the requirements and principles is the granting of relatively greater dispersion in programs of study than is permissible under a strict application of the principle of interrelation of subjects in a specialized field.

**Language Requirements.**—The candidate for a Master's degree in a professional field is exempt from the requirement of a reading knowledge of a modern foreign language.

**Other Requirements.**—The other requirements for the Master's degree in a professional field, especially those concerning the thesis, residence and examination are the same as for the Master of Science degree.

**Professional Degrees**

Master of Agriculture  
Master of Textiles  
Ceramic Engineer

Chemical Engineer  
Civil Engineer  
Electrical Engineer

Mechanical Engineer

**Significance.**—The professional degrees are not honorary; they are tests of ability and testimonials of accomplishment. To merit the professional degree, a candidate must write a thesis, which demonstrates his ability to attack and to solve a new problem of sufficient complexity to require distinctly original processes, and the solution of which shall make, however small, a real contribution to his profession. The record of his work must demonstrate his power to conceive, to plan, to organize, to carry through to completion a project of considerable magnitude. The candidate should quite obviously have grown professionally since his graduation and evince intellectual vitality to guarantee the continuance of his growth.

**Requirements**

1. The degree of Master of Agriculture may be conferred upon graduates of State College after five years of service in agriculture, or upon graduates of similar institutions who have performed outstanding professional service in agriculture for the State of North Carolina for a continuous period of not less than five years. The candidate for the degree of Master of Agriculture must submit a satisfactory thesis which demonstrates his ability to handle an original problem related to his professional service in agriculture.
2. The degrees in Engineering or the Master of Textiles may be conferred upon graduates of State College after five years' professional practice in responsible charge of important work, upon the acceptance of a thesis on a subject related to the practice in which the applicant has been engaged.
3. Applications for the degree must be presented to the Associate Dean of the Graduate School not less than nine months before the degree is conferred.
4. With the application for a degree, the candidate must present for approval the subject and outline of a thesis and a detailed statement of his professional work since graduation.
5. The preliminary copy of the thesis must be submitted to the Associate Dean of the Graduate School at least four months before the commencement at which the degree is to be conferred. The completed thesis in approved form must be submitted at least two months before the degree is awarded.
6. When his thesis and detailed statement of his professional work have been approved, the candidate shall appear before his Advisory Committee for oral or written examination on his professional work and thesis.

**Fees**

The candidate for a Professional Degree will pay \$10.00 when he matriculates and \$15.00 for his diploma.

**The Degree of Doctor of Philosophy**

The Degree of Doctor of Philosophy is offered in coöperation with The University at Chapel Hill under supervision of the Graduate School of the Consolidated University of North Carolina.

The Degree of Doctor of Philosophy is offered in certain specified departments. Graduate students who expect to become candidates for the degree are already registered in the Departments of:

Agricultural Economics	Entomology
Agronomy	Plant Pathology
Rural Sociology	

Offerings will be provided in other departments as rapidly as personnel and facilities can be developed.

**Information**

Further information about graduate work at State College may be secured from Z. P. Metcalf, Associate Dean of the Graduate School, N. C. State College, Raleigh, N. C.

**DIVISION OF COLLEGE EXTENSION**

Edward W. Ruggles, Director

**Purpose.**—The College Extension Division is organized to carry the practical and cultural advantage of college studies to persons who cannot attend classes on the campus, and to groups and communities that may profit by the service offered through the following means.

**Extension Classes** are organized where at least fifteen persons are interested and willing to take up the same subject. Such matters as the distance from the college, the nature of the subject, and the availability of instructors must be taken into consideration.

**Correspondence Courses** for college credit are offered in Agronomy, Animal Husbandry, Horticulture, Soils, Poultry, Agricultural Economics, Rural Sociology, Chemistry, Education, Economics, English, Geology, History, Architectural Engineering, Ceramic Engineering, Mechanical Engineering, Mathematics, Modern Languages, Sociology, Safety, and Zoölogy. The list of these courses is being added to as rapidly as possible. Complete information concerning them is included in the Bulletin of Correspondence Courses.

**Correspondence Courses** of a practical nature are offered in Business English, Mathematics, Industrial Electricity, Land Surveying, Plumbing, Engineering Drawing, Building and Estimating, Sheet-metal Pattern Drafting, Municipal Administration, Poultry, Business Law, and Vegetable Gardening. In addition, the courses in Ceramic Engineering may be taken as practical where no credit is desired.

Short Courses are offered by the College Extension Division to tie up the facilities of the several Schools of State College with the trades and industries of North Carolina into a permanent educational program. In carrying out this program, short courses of a practical nature are offered every year which are increasing in popularity. During the present school year the following short courses and institutes are scheduled: Electrical Meters and Relays, Engineers, Surveyors, Gas-Plant Operators, Water-Works Men, Retail Coal Merchants, Electrical Contractors, Building Inspectors, and a Safety School for Truck Operators. Additional courses are being added as the demand arises.

College Extension Lectures by members of the faculty and concerts by the college musical organizations are available to any high school, civic club, woman's club, science club, agricultural or engineering meeting or organization, desiring to put on a good lecture or musical program.

**Engineering, Science, and Management War Training.**—Under the auspices of the United States Office of Education, and in coöperation with the School of Engineering, the College Extension Division offers Engineering, Science, and Management War Training courses designed to meet the shortage of engineers, scientists, and production supervisors with specialized training in fields essential to war industries. Courses offered include: Aerial Bombardment Protection, Aircraft Inspection, Aircraft Instruments, Architectural and Marine Drafting, Chemical Testing and Inspection, Diesel Engineering, Engineering Drawing, Fabric Inspection and Testing, Production Supervision, Radio Communication, and Surveying. Courses offered are divided into two groups: (1) Courses primarily directed toward employment in new fields. These will generally be given as full-time courses, either on or off North Carolina State College campus, and will involve at least 40 hours a week in class and preparation. (2) Courses primarily directed toward training those now employed for increased responsibility or improved technique. These will generally be part-time evening courses, either on or off campus. They will involve about 15 hours a week in class and preparation.

Bulletins describing the various functions of the Division will be gladly supplied on request. Write to Edward W. Ruggles, Director, College Extension Division, North Carolina State College, Raleigh, North Carolina.

**Full Information.**—Any person interested in extension classes or correspondence courses should write to the College Extension Division, requesting the Extension Bulletin, which contains complete information concerning methods of instruction, fees, and the conditions upon which College credit will be granted.

## DESCRIPTION OF COURSES

### AERONAUTICAL ENGINEERING

#### Courses for Advanced Undergraduates

**Aero. E. 300. General Aeronautics** 0-3-0

Prerequisites: Math. 101, 2, 3.

Required of juniors taking Aeronautical Engineering. A study of simple aerodynamics and the airplane.

Text: Carter, *Simple Aerodynamics*.

Mr. Truitt.

**Aero. E. 310. Elementary Aeronautics** 0-0-3

Prerequisites: Phys. 201, 202, 203.

Required of juniors taking Aeronautical Engineering. A study of the design of simple component parts of the airplane.

Text: Anderson, *Aircraft Layout and Detail Design*.

Staff.

**Aero. E. 332, 333. Air Transportation\*** 0-3-3 or 3-3-0

Prerequisites: Aero. E. 310.

The various phases of airport design, air transportation and airline operation are studied in this course. This includes a survey of existing conditions, factors governing development, topographic survey, runway layout, methods of aircraft operations, personnel organization and aviation law. Practical examples are studied at the University-owned and operated airport.

Text: *Lecturer's Notes*.

Dr. Friedrich.

**Aero. E. 351, 352. Advanced General Aeronautics\*** 6-6-0 or 0-6-6

Elective.

Ground school course for those students wishing to receive flight training under the Civil Aeronautics Administration Program. The scope of the course embraces Navigation, Meteorology and the prescribed ground school subjects.

Text: *C.A.A. Manuals*.

Staff.

**Aero. E. 411, 412. Aircraft Manufacturing** 0-3-3 or 3-3-0

Prerequisite: Aero. E. 310.

Required of seniors taking Aeronautical Engineering.

A study of airplane manufacturing principles, methods and processes.

Text: *Lecturer's Notes*.

Dr. Friedrich.

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\* Will not be given in 1945-46.

Aero. E. 421, 422, 423. Airplane Design	3-3-3
Prerequisites: E.M. 313, 322, C.E. 321 and Aero. E. 310.	
Required of seniors taking Aeronautical Engineering.	
A study of the design and construction of airplanes.	
Text: Niles & Newell, <i>Vol. I, Airplane Structures</i> ; Teichmann, <i>Airplane Design Manual</i> .	Mr. Rautenstrauch.
Aero. E. 431, 432, 433. Aerodynamics	3-3-3
Prerequisites: Math. 303, Aero. E. 310.	
Required of seniors taking Aeronautical Engineering.	
A study of engineering aerodynamics, airplane performance and stability, and airworthiness specifications.	
Text: Diehl, <i>Engineering Aerodynamics</i> ; Jones, <i>Elements of Practical Aerodynamics</i> .	Mr. Rautenstrauch.
Aero. E. 441, 442, 443. Aeronautical Laboratory	1-1-1
Prerequisites: M.E. 313, 314, 315.	
Required of seniors taking Aeronautical Engineering.	
Laboratory testing and study of practical aspects of modern airplane construction, operation and maintenance.	Staff.
Aero. E. 451, 452. Aircraft Engines	3-3-0 or 0-3-3
Prerequisites: M.E. 307, 308, 309.	
Required of seniors taking Aeronautical Engineering.	
The practical aspect of aircraft engine operation and design including carburetors, magnetos, super-chargers, fuel and oil systems, engine installations and accessories.	
Text: <i>Lecturer's Notes</i> .	Dr. Friedrich.
Aero. E. 461. Aircraft Instruments and Navigation*	3-0-0
Prerequisites: Aero. E. 310 or 351 and 352.	
Elective.	
This course deals with the instruments used in aircraft engine operation, flight indication, and in navigation. The use, principle of operation, and calibration is studied in detail. The fundamentals of navigation include problems in navigation such as course plotting, radius of action from fixed and moving bases and interception.	
Text: <i>Lecturer's Notes</i> .	Staff.

\* Will not be given in 1945-46.

**Aero. E. 471. Aircraft Propeller Design\*** 3-3-3

Prerequisites: Aero. E. 310.

Elective.

The various theories are discussed in this design course. This embraces effect of blade shape, tip speed, and gearing on propeller performance. The various types of propellers are studied in detail.

Text: Wieck, *Aircraft Propeller Design*.

Mr. Rautenstrauch.

#### Courses for Graduates Only

**Aero. E. 531, 532, 533. Advanced Aerodynamics** 3-3-3

Prerequisites: Aero. E. 431, 432, 433.

Advanced performance calculations and tests.

Mr. Rautenstrauch.

**Aero. E. 541, 542, 543. Aeronautics Research** 3-3-3

Prerequisites: Aero. E. 441, 442, 443.

Research and thesis in connection with an aeronautical project.

Dr. Friedrich.

## AGRICULTURAL ECONOMICS

#### Courses for Advanced Undergraduates

**Agr. Econ. 202. Agricultural Economics.** 0-0-3

Prerequisites: Econ. 205 or Econ. 201, 202.

Required of sophomores in Agriculture.

The economics of agricultural production, the marketing of farm products, farm credit, land tenure, and other major economic problems of the farmer.

Staff.

**Agr. Econ. 212. Land Economics.** 0-3-0

Prerequisites: Econ. 205 or 201, 202.

Required of sophomores in Forestry, and in Wildlife Conservation and Management.

Land economics including land classification and land use with special emphasis on forest land; land ownership and control; the principles of land valuation; policies of land settlement and development; the taxation of forest lands.

Staff.

Agr. Econ. 303. Farm Management I. 0-0-3  
 Prerequisites: Econ. 205 or 201, 202.  
 Required of juniors in Agricultural Economics, Agriculture and Agricultural Education.  
 Successful operation of the farm, farm planning, management of labor, farm work programs, use of machinery, and farm administration.  
 Messrs. Forster, Greene.

Agr. Econ. 313. Farm Accounting. 0-0-3  
 Prerequisite: Econ. 205 or 201, 202.  
 Required of juniors in Vocational Agriculture.  
 Farm accounting, preparation of inventories of farm property, simple financial statements, methods of keeping farm records, analysis and the interpretation of results obtained from farm business transactions.  
 Mr. Greene.

#### Courses for Graduates and Advanced Undergraduates

Agr. Econ. 402, 403. Farm Cost Accounting. 0-3-3  
 Prerequisites: Econ. 205 or 201, 202, and 301.  
 Required of seniors in Agricultural Economics.  
 Accounting applied to farm transactions, the preparation of financial statements, the methods of keeping farm records, analysis of an individual farm record, the interpretation of the results from cost-accounting.  
 Mr. Greene.

Agr. Econ. 411. Agricultural Marketing. 3-0-0  
 Prerequisites: Econ. 205 or 201, 202.  
 Required of seniors in Agricultural Economics, Agriculture, and Vocational Education.  
 Successful marketing of farm products, market organization and control, price-making forces; critical examination of the present system of marketing farm products.  
 Mr. Leager.

Agr. Econ. 412. Problems of Land Economics. 0-3-0  
 Prerequisites: Econ. 201, 202, Agr. Econ. 202, and 6 additional term credits in Economics.  
 Elective.  
 Land classification; ownership and acquisition of land; tenancy and land ownership; the functions of the landlord and the tenant; land valuation and land speculation.  
 Messrs. Forster, Hamilton.

**Agr. Econ. 421. Marketing Methods and Problems.** 3-0-0

Prerequisites: Econ. 201, 202, Agr. Econ. 202, and 6 additional term credits in Economics.

Required of seniors in Agricultural Economics.

The problems and methods involved in the marketing of farm products; suggestions for improvement. Mr. Kenyon.

**Agr. Econ. 422. Agricultural Coöperation.** 0-3-0

Prerequisites: Econ. 205 or 201, 202.

Required of seniors in Agricultural Economics.

Local community coöperation, both economic and social; farmers' buying, selling, and service organizations. Mr. Kenyon.

**Agr. Econ. 423. Farm Management II.** 0-0-3

Prerequisite: Agr. Econ. 303.

Required of seniors in Agricultural Economics.

The factors involved in the management and organization of typical farms in the State. Messrs. Greene, Forster.

**Agr. Econ. 431. Agricultural Prices.** 3-0-0

Prerequisites: Econ. 201, 202, Agr. Econ. 202, 303.

Elective.

Behavior of agricultural prices; their relation to consumption, production of farm products, and marketing practices; methods of price analysis applied to agricultural products. Mr. Anderson.

**Agr. Econ. 432. Agricultural Finance.** 0-3-0

Prerequisites: Econ. 205 or 201, 202, Agr. Econ. 202, and 6 additional term credits in Economics.

Elective.

Financing the production and marketing of agricultural products. Consideration of farm mortgage credit, personal and intermediate credit, and agricultural taxation. Mr. Leager.

**Agr. Econ. 442. Cotton and Tobacco Marketing.** 0-3-0

Prerequisites: Econ. 205 or 201, 202, Agr. Econ. 202, Agr. Econ. 411, and 3 additional credits in Economics.

Required of seniors in Agricultural Economics.

The problems, methods, and practices used in the marketing of tobacco and cotton. Mr. Forster.

Agr. Econ. 452. History of the Agricultural Adjustment Program. 0-3-0  
Elective for juniors and seniors in Agriculture.

Economics of the Agricultural Adjustment Acts, and of the Agricultural Conservation Programs; the effect of the programs on production and prices of cotton, tobacco, wheat, corn, and hogs. Mr. Forster.

Courses for Graduates Only

Agr. Econ. 501. Economics of Agricultural Production. 3-0-0

Prerequisites: Econ. 201, 202, Agr. Econ. 202, and 6 additional term credits in Economics.

Economic theories and methods of analyses applicable to agricultural production. Mr. Forster.

Agr. Econ. 502. Farm Organization and Management. 0-3-0

Prerequisites: Agr. Econ. 303, 423, 501, and 6 additional term credits in Economics.

The extension of the economic principles discussed in Agr. Econ. 501, and their application to the problems of farm organization and management. Mr. Forster.

Agr. Econ. 503. Agricultural Finance. 0-0-3

Prerequisites: Econ. 201, 202, Agr. Econ. 432, and 6 additional term credits in Economics.

Problems in financing agricultural production and marketing. A history of the development of financial institutions designed to serve agriculture. Mr. Leager.

Agr. Econ. 513. Coöperative Marketing Methods and Practices. 0-0-3

Prerequisites: Econ. 201, 202, Agr. Econ. 432, and 6 additional term credits in Economics.

A critical study of the methods and practices used by large agricultural coöperatives. Mr.....

Agr. Econ. 521, 522, 523. Research in Agricultural Economics. 3-3-3

Prerequisites: Economics 201, 202, and 6 additional term credits in Economics.

A consideration of the research method and procedure now being employed by research workers in the field of Agricultural Economics, including qualitative and quantitative, inductive and deductive methods of research procedure; choice of projects, planning, and execution of the research project. Messrs. Forster, Greene.

**Agr. Econ. 531, 532, 533. Analysis of National Policies and Agricultural Action Programs.**

3-3-3

Prerequisites: Econ. 201, 202, Agr. Econ. 202 and six additional term credits in Economics or Agricultural Economics.

Critical discussion of modern methods of economic analysis from the viewpoint of their applicability to problems of economic policy: an examination of the major agricultural action programs in the United States; the analysis of principles of economic policy with regard to their effect upon national and farm income and income distribution.

Mr. Forster.

## AGRICULTURAL ENGINEERING

### Courses for Undergraduates

**Agr. Eng. 202. Farm Equipment.**

0-3-0

Prerequisites: Math. 100 or Physics 115 or 201. Required of sophomores in Agriculture.

Modern equipment and buildings for the farm.

Mr. Weaver.

**Agr. Eng. 212. Farm Engines.**

0-3-0

Prerequisite: Physics 115 or 201. Required of sophomores in Agr. Eng. and juniors in Animal Production and in Dairy Manufacturing.

The principles of gas-engine operation and their application to farm uses; selection, operation, and repair of engines.

Mr. Giles.

**Agr. Eng. 222. Agricultural Drawing.**

0-3-0

Elective for juniors and seniors.

Drawing-board work covering both freehand sketching and elementary mechanical drawing; working and pictorial drawing, lettering, maps, graphs, tracing, and blueprinting.

Mr. Weaver.

### Courses for Advanced Undergraduates

**Agr. Eng. 303. Terracing and Drainage.**

0-0-3

Prerequisites: Soils 201 and Agr. Eng. 202.

Required of juniors in Agr. Eng., juniors in Floriculture, Pomology and Vegetable Gardening, and of seniors in Animal Production, Poultry Science, and Farm Business.

The different methods of disposing of surplus water and the prevention of erosion.

Mr. Weaver.

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Agr. Eng. 313. Farm Machinery and Tractors. 0-0-3

Prerequisite: Agr. Eng. 202.

Required of seniors in Agr. Eng., and in Poultry Science.

The design, construction, and operation of modern labor-saving machinery for the farm. Mr. Giles.

Agr. Eng. 322. Farm Buildings. 0-3-0

Prerequisite: Agr. Eng. 202.

Required of juniors in Agr. Eng., and seniors in Agr. Economics.

The design, construction, and materials used in modern farm buildings. Mr. Weaver.

Agr. Eng. 331, 332. Farm-Shop Work. 3-3-0

Prerequisite: Agr. Eng. 202.

Required of juniors in Agr. Eng., and in Vocational Agriculture.

Lecture and laboratory practice, in drafting, sharpening farm tools, making concrete, woodworking, cold-metal working, forging, soldering, and pipe fitting. Mr. Giles.

Courses for Graduates and Advanced Undergraduates

Agr. Eng. 403. Erosion Prevention. 0-0-3

Prerequisite: Agr. Eng. 303.

Required of seniors in Agr. Eng.

The causes and effects of erosion, and the methods of conserving our greatest national resource—our fertile soil. Mr. Weaver.

Agr. Eng. 423. Farm Structures. 0-3-0 or 0-0-3

Prerequisite: Agr. Eng. 322.

Required of seniors in Agr. Eng.

Modern building methods as applied to farm structures; the use of labor-saving barn equipment and methods of reducing labor to a minimum; the placing of the farm group in relation to topography and farm activities, for economy, appearance, and utility. Mr. Weaver.

Agr. Eng. 432. Rural Electrification. 0-3-0

Prerequisite: Agr. Eng. 322.

Required of seniors in Agr. Eng.

Problems involved in the distribution, uses, and costs of electricity on the farm. Mr. Weaver.

Agr. Eng. 433. Teaching Farm-Shop Work. 0-0-3

Prerequisites: Agr. Eng. 331 and 332.

Elective for juniors and seniors in Vocational Agriculture.

The use and care of power tools; shop management and methods of presenting the subject matter. Messrs. Giles, Coggins.

Agr. Eng. 481, 482, 483. Special Problems in Agricultural Engineering. 3-3-3

Prerequisites: Agr. Eng. Three credits in 300 courses.

Only one term required of seniors in Agr. Eng., other two elective.

For students who desire advanced work in one of the following subjects: Farm Engines, Tractors, Farm Mach., Buildings, Conveniences, Rural Electrification, Erosion Control and Drainage.

Messrs. Weaver, Giles.

Agr. Eng. 491, 492, 493. Senior Seminar. 1-1-1

Prerequisite: Senior standing in Agr. Eng.

Required of seniors in Agr. Eng.

Students will be assigned special problems the results of which are to be presented to the class. Messrs. Weaver, Giles.

## ANIMAL HUSBANDRY AND DAIRYING

### Courses for Undergraduates

A. H. 202. Animal Nutrition I. 0-3-0 or 0-0-3

Prerequisites: Chem. 101, 102, 103.

Required of sophomores in Agriculture.

Animal nutrition; composition of the animal body; digestion; nutrients; feeding standards; calculating rations. Messrs. Haig, Ruffner.

### Courses for Advanced Undergraduates

A. H. 301. Farm Meats I. 3-0-0 or 0-3-0 or 0-0-3

Elective for juniors and seniors in Agriculture. Required of juniors in A. H. and seniors in Pomology and Poultry Science.

Composition and value of meat, with practice in slaughtering and cutting. Mr. Brady.

## A. H. 302. Farm Meats II.

0-3-0

Prerequisite: A. H. 301.

Elective for juniors and seniors in Agriculture.

Study and practice in making retail cuts and curing pork, beef, and lamb.

Mr. Brady.

## A. H. 303. Judging Block Animals.

0-0-3

Elective for juniors and seniors in Agriculture.

Market and show-ring requirements for horses and mules, beef cattle, sheep, and swine. Breed characteristics of these animals in detail; practice judging of the relation of form to function in livestock. Mr. Brady.

A. H. 311. Comparative Anatomy and Physiology of Domestic  
Animals.

3-0-0

Prerequisite: Zool. 102.

Elective for juniors and seniors in Agriculture.

The structure and functions of the animal body. Laboratory, lectures and recitations. Mr. Grinnells.

## A. H. 312. Judging Dairy Cattle.

0-3-0

Show-ring requirements for the five major breeds of dairy cattle. Breed characteristics of these animals in detail; practice judging of the relation of form to function in dairy cattle. Mr. Haig.

## A. H. 313. Sheep Production.

0-0-3

Elective for juniors and seniors in Agriculture. Required of seniors in Animal Husbandry.

Establishment, care, and management of the farm flock. Mr. Foster.

## A. H. 321. Dairy Cattle and Milk Production.

3-0-0

Elective for juniors and seniors in Agriculture. Required of seniors in Poultry Science and Agricultural Engineering.

Management of dairy cattle for economical milk production, including dairy-breed characteristics, adaptation, selection, management, feeding, calf raising, dairy barn equipment. Mr. Haig.

**A. H. 322. History of Breeds of Farm Animals.** 0-3-0  
 Required of juniors in Animal Prod. Elective for juniors and seniors in Agriculture.

Types, characteristics, and history of the leading strains and families of the different breeds of farm animals. Messrs. Ruffner, Haig.

**A. H. 323. Market Types of Livestock.** 0-0-3  
 Required of juniors in Animal Prod. Elective for juniors and seniors in Agriculture.  
 A study of stock animals from both the market and feed lot standpoint. Mr. Hostetler.

**A. H. 331. Swine Production.** 3-0-0  
 Required of juniors in Animal Production and seniors in Poultry Science. Elective for juniors and seniors in Agriculture.  
 Adaptability of swine, with emphasis on feeding, judging, and management. Mr. Hostetler.

**A. H. 332. Testing of Milk Products.** 0-4-0  
 Elective for juniors and seniors in Agriculture. Required of seniors in Animal Husbandry and juniors in Dairy Manufacturing.  
 Testing of milk and milk products for butterfat, acidity, adulteration, preservatives, and sediment. Mr. Clevenger.

**A. H. 333. Cheese Making.** 0-0-3  
 Elective for juniors and seniors in Agriculture. Required of juniors in Dairy Manufacturing.  
 Lectures and laboratory practice in making various soft and hard cheeses usually made on a farm or in a cheese factory. Mr. Clevenger.

**A. H. 341. Dairying.** 3-0-0 or 0-3-0  
 Required of juniors in Animal Prod. and seniors in Vegetable Gardening. Elective for juniors and seniors in Agriculture.  
 Fundamentals of dairy-herd management in the production of milk and cream on the farm. Laboratory work: the use of the Babcock Test, butter making on the farm, operation of cream separators. Mr. Haig.

A. H. 342. Dairy Manufacture Practice.	0-3-0
Elective for juniors and seniors in Agriculture. Required of juniors in Dairy Manufacturing.	
Lectures and laboratory practice on the business and factory management used in dairy plants.	Mr. Clevenger.
A. H. 343. City Milk Supply.	0-0-4
Elective for juniors and seniors in Agriculture. Required of juniors in Dairy Manufacturing.	
Lectures and laboratory practice; the phases of the city milk supply from the standpoint of the Milk Inspector and Board of Health; the methods and processes used in a central pasteurizing milk distribution plant and by the dairymen supplying the milk; the problems of the retail distributor of raw milk.	Mr. Clevenger.
A. H. 351. Horse and Mule Production.	3-0-0
Elective for juniors and seniors in Agriculture.	
Methods in production and management of horses and mules for work on farms under Southern conditions. Special study of home-grown feeds for horses and mules at work or idle.	Mr. Haig.
A. H. 352. Common Diseases.	0-3-0
Elective for juniors and seniors in Agriculture.	
Contagious, non-contagious, and parasitic diseases of farm animals. Laboratory, lectures, recitations.	Mr. Grinnells.
A. H. 353. Animal Hygiene and Sanitation.	0-0-3
Elective for juniors and seniors in Agriculture. Required of juniors in A. H. and of senior Teachers of Agriculture.	
Animal health and prevention of disease as affected by environment. Lectures, reference reading, recitations.	Mr. Grinnells.
A. H. 361. Animal Nutrition II .	3-0-0 or 0-0-3
Prerequisite: A. H. 202.	
Required of juniors in Animal Prod. Elective for juniors and seniors in Agriculture.	
Feeding stuffs used in America; laws controlling feeding stuffs; preparation of feeds; home-mixed and commercial feeds.	Mr. Peterson.

**A. H. 362. Dairy Machinery.** 0-1-0

Elective for juniors and seniors in Agriculture. Required of seniors in Dairy Manufacturing and Agr. Engineering.

Lecture and demonstration on the installation, kind, care, and handling of dairy-plant equipment, including the refrigerating unit, pipe fitting, soldering.

Mr. Clevenger.

**A. H. 371. Creamery Butter Making.** 4-0-0

Elective for juniors and seniors in Agriculture. Required of juniors in Dairy Manufacturing.

Principles and practices of factory butter making, from the care of the cream on the farm through the different processes until ready for marketing.

Mr. Clevenger.

**A. H. 372. Beef Cattle Production.** 0-3-0

Elective for juniors and seniors in Agriculture. Required of seniors in Animal Husbandry.

A study of the feeding, care, and adaptation of beef cattle to North Carolina conditions.

Mr. Foster.

**A. H. 381. Ice-cream Making.** 4-0-0

Elective for juniors and seniors in Agriculture. Required of juniors in Dairy Manufacturing.

Standardizing of mixing and freezing ice-cream, sherbets, and other frozen products, and the physical principles involved; types of freezers, flavoring materials, fillers and binders; ice-cream standards. Theory and practice of refrigeration; its use in the ice-cream plant.

Mr. Clevenger.

**A. H. 391, 392, 393. Senior Seminar.** 1-1-1

Prerequisite: A. H. 202.

Required of seniors in A. H.

A discussion of livestock problems by extension and research workers, together with special assignments to students with regard to various phases of the industry.

Animal Husbandry Staff.

**A. H. 394. Judging Dairy Products.** 0-0-1

Elective for juniors and seniors in Agriculture. Required of seniors in Dairy Manufacturing.

A course of training for students in judging all dairy products according to official standards and commercial grades.

Mr. Clevenger.

**A. H. 395. Summer Practicum.**

3 credits

Prerequisites: 18 credits in Animal Husbandry.

Required of all students in Animal Production and Dairy Manufacturing.

This course requires a minimum of six weeks practical work on an approved livestock farm or in a creamery. If the work is done at the College farms or College creamery, no remuneration other than specified credit will be allowed. Each student will be required to submit an outline of his proposed work during the spring term and a final report of the work done during the fall term.

Staff.

**Courses for Graduates and Advanced Undergraduates****A. H. 401, 402, 403. Dairy Manufactures.**

3-3-3

Prerequisites: A. H. 202 and 12 hours of the dairy manufacturing courses.

Required of seniors in Dairy Manufacturing.

Special problems dealing with the manufacture and marketing of dairy products.

Mr. Clevenger.

**A. H. 412. Animal Nutrition III.**

0-3-0

Prerequisites: A. H. 202, A. H. 361.

Elective for seniors in Agriculture.

A study of the chemistry and physiology of nutrition and the processes of animal life; recent scientific publications studied.

Mr. Peterson.

**A. H. 413. Herd Improvement.**

0-0-3

Prerequisites: A. H. 202, 341, 361.

Elective for juniors and seniors in Agriculture. Required of juniors in A. H.

This course is designed for training students as supervisors of Herd Improvement Associations in North Carolina. Rules for Advanced Registry are studied; practical work in keeping feed costs, the Babcock Test, and book-keeping necessary for dairy associations.

Mr. Haig.

**A. H. 421. Animal Breeding.**

4-0-0

Elective for juniors and seniors in Agriculture. Required of seniors in Animal Husbandry.

A study of breeding and improvement of domestic animals; a first-hand study of successful breeding establishments and their problems.

Mr. Ruffner.

**A. H. 432. Pure-Bred Livestock Production.** 0-3-0

Prerequisites: A. H. 202, 331.

Elective for seniors in Agriculture. Required of seniors in Animal Husbandry.

A study of the pure-bred livestock industry. Lectures and discussion supplemented by assignments from current periodicals and breed papers. Special study of the selection of livestock best suited to different localities.

Mr. Ruffner.

**A. H. 433. Stock Farm Management.** 0-0-3

Prerequisite: A. H. 202.

Elective for juniors and seniors in Agriculture. Required of seniors in Animal Husbandry.

A study of successful methods of operating farms devoted chiefly to livestock production; special reference is made to best systems applied to North Carolina conditions.

Mr. Ruffner.

**A. H. 441, 442, 443. Problems in Advanced Animal Breeding.**

3-0-0, 0-3-0, 0-0-3

Prerequisite: A. H. 421.

Elective for seniors in Agriculture.

A study of the physiology of reproduction. Methods and problems of breeders; influence of pedigree, herd books, and Mendelism in animal breeding.

Staff.

#### Courses for Graduates Only

**A. H. 501, 502, 503. Research Studies in Animal Husbandry.**

3-0-0 or 0-3-0 or 0-0-3

Prerequisite: Eighteen credits in Animal Husbandry.

An intensive study of experimental data.

Staff.

**A. H. 511, 512, 513. Advanced Nutrition.**

3-0-0, 0-3-0, 0-0-3

Prerequisites: A. H. 202, 361.

A survey of experimental feeding, together with a study of the fundamental and practical feeding problems of the various sections of the country. A study is made of the effects of various feeds on growth and development. Animals are used in demonstrating the effects of these various nutrients and ratios.

Mr. Peterson.

A. H. 521, 522, 523. Special Problems in Dairy Manufacturing Practice.

3-3-3

Prerequisite: Eighteen term credits in Dairy Manufacturing.

Available for graduate students interested in special dairy manufacturing problems under definite supervision and approval. Mr. Clevenger.

A. H. 531, 532, 533. Seminar.

1-1-1

Subjects assigned to be reviewed and discussed. Review of literature, scientific reports and Experiment Station bulletins. Oral and written reports.

## ARCHITECTURE AND ARCHITECTURAL ENGINEERING

### Courses for Undergraduates

Arch. 100. Pencil Sketching.

3-0-0, 0-3-0, 0-0-3

or 1-1-1

Required of seniors in L. A., and sophomores in Ind. Arts. Elective for Engineering and Textile students.

Quick sketching of objects as seen and imagined in perspective; elementary principles of perspective, especially as applied to the visualization of imagined objects. *Mimeographed Notes and Problems Sheets*.

Messrs. Paulson, Baumgarten.

Arch. 101, 102, 103. Freehand Drawing 1, 2, and 3.

2-2-2

1. Required of juniors in Arch., and Arch. Eng.

2-0-0

Water color rendering. Nature and qualities of pigments; theory of color and of tone; presentation of decorative and of pictorial subjects in monochrome and in full color. Guptill: *Reference to Color*.

2. Required of juniors in Arch., Arch. Eng., and L. A.

0-2-0

Sketching in pencil, and pen and ink from models, casts and nature. Emphasis upon tonal value, pattern of darks, character and variety of line, and accenting. Lettering. Watson: *Pencil Sketching*.

3. Required of juniors in Arch., Arch. Eng., and L. A.

0-0-2

Charcoal Drawing from architectural casts and models; emphasis upon delicacy and gradation of shade and shadow; value sketches of composition projects. Mr. Paulson.

Arch. 104s. Art Appreciation for Teachers.

0-0-3

Picture study of the list suggested by the State Board of Education for grade-school use, including paintings, architecture, and sculpture. Paulson: *Art Appreciation for Teachers*. Mr. Paulson.

**Arch. 105. Art Principles in Industry.** 3-0-0

Elective for Engineering and Textile students, required of sophomores in Industrial Arts.

Line, form, color, and aesthetic principles of practical art applicable to the design of articles for manufacture. *Mimeographed Notes*. Mr. Paulson.

**Arch. 106. Decorative Drawing.** 3-0-0, 0-3-0, 0-0-3

Required of juniors in the Textile School.

Freehand drawing and creative designing of decorative motives adaptable to weaving and cloth printing. *Mimeographed Problem Sheets*.

Mr. Paulson.

**Arch. 107. Architectural Drawing.** 3-3-0

Required of freshmen in Architecture. M. E. 105 and 106 may be substituted for Arch. 107.

[Drafting Practice.] Use of instruments in drawing plans, elevations, sections; projections; architectural lettering and conventions; tracing and blue-printing; elements of architecture and introduction to design. Pickering: *Architectural Design*. Mr. Grady.

**Arch. 111, 112, 113. Appreciation of Fine Arts, Architecture,**

**Painting, Sculpture.** 3-3-3

Elective for students of junior standing.

Principles of art. Study of those qualities which constitute great art. First term, architecture; second term, painting; third term, sculpture and the minor arts. Reinach: *Apollo*; *University Prints*; *Mimeographed Notes*. Gardner: *Art Through the Ages*. Mr. Paulson.

**Arch. 114. Clay Modeling.** 1-1-1

Prerequisite: Arch. 100.

Required of seniors in Arch.

Modeling of ornament, reliefs, and full round projects in clay or wax; moulds and plaster casting; small scale building detail models. Lectures, laboratory, and critiques. Mr. Grady.

#### Courses for Advanced Undergraduates

**Arch. 201, 202, 203. Elements of Architecture I, II, and III.** 3-3-3

Prerequisites: M. E. 105, 106, or Arch. 107.

Required of sophomores in Arch., Arch. Eng., and L. A.

Exercises and studies of architectural elements and details, walls, openings, etc. The orders of architecture and their application to simple problems in composition and design. Pickering: *Architectural Design*; Ramsey and Sleeper: *Graphic Standards*. Messrs. Shumaker, Grady.

**Arch. 205. Shades and Shadows.**

2-0-0

Prerequisite: M. E. 107.

Required of sophomores in Arch., Arch. Eng., and juniors in L. A.

The determination of conventional shades and shadows as they occur on rendered drawings. *Shelton: Architectural Shades and Shadows.*

Messrs. Shumaker, Grady.

**Arch. 206. Perspective Drawing.**

1-0-0

Prerequisite: M. E. 107.

Required of sophomores in Arch., Arch. Eng., and of juniors in L. A. and Agr. Engr.

Theory of perspective with special applications to illustration and design. Lectures and drawing. *Turner: Fundamentals of Architectural Design.*

Mr. Baumgarten.

**Arch. 207. Historic Motives in Textiles.**

0-3-0

Elective for students of junior standing.

Chronologic development of ornament motives; the adaptation of historic motives to modern textile design. *Hamlin: History of Ornament.*

Mr. Paulson.

**Arch. 211, 212, 213. Freehand Drawing 4, 5, and 6.**

3-3-3

Prerequisite: Arch. 103.

Required of fifth year Arch., elective for others.

The purpose of this course is to give the student a mastery of presentation in his own chosen medium. The first term (Arch. 211) will be devoted principally to still life; the second (Arch. 212) to landscape; the third (Arch. 213) to figure drawing. Personal technique encouraged; sound principles of drawing insisted upon.

Mr. Paulson.

**Arch. 301, 302, 303. Intermediate Design, B-1, B-2, B-3.**

3-3-3

Prerequisites: Arch. 201, 202, 203.

Required of juniors in Arch., and Arch. Eng.

Problems in elementary composition, design, planning and rendering. Library research. Registration with the Beaux Arts Institute of Design may be required. *Beaux Arts Institute Problems.* Messrs. Baumgarten, Grady.**Arch. 304. Photographic Practice.**

0-0-1

Required of juniors in Arch., and Arch. Eng.

The practical use of photography as an aid in architectural rendition. *Lectures, Notes and Assignments.*

Mr. Paulson.

**Arch. 305. Working Drawings.**

0-0-2

Prerequisites: Arch. 201, 202, 203.

Required of sophomores in Arch.

The preparation of working drawings of sections and details of construction. Ramsey and Sleeper: *Graphic Standards*; Knoblock: *Good Practice in Construction*.  
Messrs. Shumaker, Grady.

**Arch. 321, 322, 323. History of Architecture 1, 2, and 3.**

3-3-3

Prerequisite: Arch. 203.

Required of juniors in Arch., Arch. Eng., and L. A.

The origin and development of historic styles of architecture from antiquity to the nineteenth century. Illustrated lectures, library references, sketches. Fletcher: *History of Architecture*; Hamlin: *History of Architecture*.  
Mr. Baumgarten.

**Arch. 325. History of Sculpture and Mural Decoration.**

0-0-2

Prerequisite: Arch. 203.

Required of juniors in Arch.

The development of sculptural and mural art as adjuncts to architecture, ancient to modern; critique of modern decoration supplementary to architecture. Mimeographed notes, library reference and illustrated lectures.

Mr. Grady.

**Arch. 351, 352. Architectural Design E-1, E-2.**

3-3-0

Prerequisite: Arch. 303.

Required of seniors in Arch. Eng.

Advanced Architectural Design studied especially from the viewpoint of structure; projects developed with wall and spanning sections; rendered presentation of practical constructive programs.

Messrs. Baumgarten, Grady.

**Arch. 353, 354, 355. Architectural Design B-4, B-5, and B-6.**

6-6-6

Prerequisite: Arch. 303.

Required of seniors in Arch.

Advanced programs in architectural design. Registration with the Beaux Arts Institute of Design may be required. Complete presentation drawings of projects such as Class B—*Beaux Arts Institute Problems*.

Messrs. Baumgarten, Grady.

Arch. 401, 402, 403. Architectural Design A-I, A-II, A-III.	6-6-6
Prerequisite: Arch. 355.	
Required of fifth year in Arch.	
Major problems in advanced planning and research. Registration with the Beaux Arts Institute of Design may be required. <i>Beaux Arts Institute Problems.</i>	
	Messrs. Shumaker, Baumgarten, Grady.
Arch. 407. Architectural Composition.	2-0-0
Prerequisite: Arch. 323.	
Required of fifth year in Arch.	
Principles of planning and composition as related to buildings; architectural motives, group planning; library research and sketches. <i>Curtis: Architectural Composition.</i>	
	Mr. Shumaker.
Arch. 408. Architectural Estimates.	0-0-2
Prerequisite: Arch. 305.	
Required of fifth year in Arch. and seniors in Arch. Engr.	
Lectures and problems in taking off quantities and in estimating materials and labor cost in building construction. <i>Mimeographed Notes.</i>	
	Mr. Shumaker.
Arch. 409. Building Materials I.	3-0-0
Prerequisite: Arch. 303.	
Required of seniors in Arch. and Arch. Eng.	
Nature and qualities of building materials, especially fabricated materials, and their use in interior and exterior finish and in construction. Sample exhibits, lectures and demonstrations. <i>Manufacturers' Data Sheets.</i>	
	Mr. Grady.
Arch. 411, 412. Architectural Office Practice.	0-3-3
Prerequisite: Arch. 305.	
Required of juniors in Arch., seniors in Arch. Eng.	
The preparation of working drawings from sketches, following office routine? Knoblock: <i>Good Practice in Construction</i> ; Ramsey and Sleeper: <i>Graphic Standards.</i>	
	Messrs. Baumgarten, Grady.
Arch. 414. Professional Practice.	0-0-1
Prerequisite: Econ. 307.	
Required of fifth year in Arch.	
Ethics and procedure in the profession of architecture. Relation of patron and commissionee. <i>Mimeographed Notes.</i>	
	Mr. Shumaker.

Arch. 415. City Planning.	0-2-0
Prerequisite: Arch. 323.	
Required in fifth year in Arch.	
Origin and development of urban communities; aesthetic, economic, and circulatory problems in city and town planning; zoning and restraining legislation.	Messrs. Shumaker, Baumgarten.
Arch. 416. Architectural Specifications.	0-0-3
Prerequisite: Econ. 307.	
Required of seniors in Arch. and Arch. Eng.	
Execution of specifications for architectural building contracts; identification of material, clarification of terms; protection of patron, contractor, and architect. <i>Mimeographed Notes.</i>	Mr. Shumaker.
Arch. 421. History of Architecture 4.	0-3-0
Prerequisite: Arch. 323.	
Required in fourth year in Arch.	
Nineteenth century and contemporary architectural styles, with special attention to trends resulting from the use of modern materials; illustrated lectures, discussion assignments, and reports. Fletcher: <i>History of Architecture.</i>	Mr. Baumgarten.
Arch. 501, 502, 503. Graduate Design I, II, III.	4-4-4
Prerequisites: Arch. 323, 403 (or 352).	
Class A.—Project. Advanced problems in design. Archaeology. Measured Drawings. Registration with the Beaux Arts Institute of Design is required. <i>Beaux Arts Institute Problems.</i>	Messrs. Shumaker, Baumgarten, Grady.
Arch. 511, 512, 513. Historic Research I, II, III.	4-4-4
Prerequisites: Arch. 323, 403 (or 352).	
Research in Architecture and Art in some important phase of its development. Library work with sketches. <i>Library References.</i>	Messrs. Paulson, Baumgarten, Grady.

## BOTANY

## Courses for Undergraduates

Bot. 101, 102. General Botany.	4-4-0
Required of freshmen and sophomores in Agriculture.	
The first term: the structure and physiology of the higher plants; the second: a survey of the major lower plant groups with the emphasis upon the economic forms, bacteria and fungi.	
Messrs. Wells, Shunk, Anderson, Whitford, Buell.	
Bot. 203. Systematic Botany.	0-0-3
Prerequisites: Bot. 101, 102.	
Elective in Agriculture and Science.	
An introduction to the local flora and the classification of the plants included therein.	
Messrs. Wells, Shunk, Whitford, Buell.	
Bot. 211-213. Dendrology.	3-0-3
Prerequisites: Bot. 101, 102, 203.	
Required of sophomores in Forestry.	
The principal trees of North America.	Mr. Buell.
Bot. 221. Plant Physiology.	0-0-5
Prerequisites: Bot. 101, 202.	
Required of sophomores in Forestry.	
The activities of living plants with special emphasis upon the fundamental principles concerned.	Mr. Anderson.

## Courses for Advanced Undergraduates

Bot. 301. Diseases of Field Crops.	3-0-0
Prerequisites: Bot. 101, 102.	
Elective for juniors and seniors.	
The more important diseases of field crops, such as cotton, tobacco, corn, small grains, legumes, and grasses; emphasis on symptoms, cause, and control.	Mr. Lehman.
Bot. 303. Diseases of Fruit and Vegetable Crops.	0-0-3
Prerequisites: Bot. 101, 102, 221.	
Elective for juniors and seniors.	
Lectures and laboratory studies of importance, causes, symptoms, and control of diseases affecting these crops.	Mr. Jensen.

<b>Bot. 311. Diseases of Forest Trees.</b>	3-0-0
Prerequisites: Bot. 101, 102, 221.	
Required of seniors in Forestry.	
Lectures and laboratory studies of importance, causes, symptoms, and control of diseases affecting trees and their products.	Mr. Ellis.
 <b>Bot. 401. Methods in Plant Pathology.</b>	
Prerequisites: Bot. 101, 102, 221, 301 or 303.	
Elective.	
A detailed survey of essential methods in the study of plant pathological problems.	Mr. Jensen.
 <b>Bot. 402. General Bacteriology.</b>	0-4-0
Prerequisites: Bot. 101, 102, or Zool. 101.	
Required of juniors or seniors in Agriculture.	
An introduction to the principles of bacteriology; laboratory work on modern cultural methods of handling and studying bacteria.	Mr. Shunk.
 <b>Bot. 411-412. Plant Morphology.</b>	3-3-0
Prerequisites: Bot. 101, 102, 203.	
Elective in Agriculture and Forestry.	
An advanced survey of plants; the lower groups are given the first term, the higher (land plants) the second.	Messrs. Wells, Shunk, Whitford.
 <b>Bot. 432. Advanced Plant Physiology.</b>	0-3-0
Prerequisites: Bot. 101, 102, 221.	
A critical and comprehensive treatment of the various aspects of plant physiology; particular attention given to basic principles and to recent developments.	Mr. Anderson.
 <b>Bot. 441. Plant Ecology.</b>	3-0-0
Prerequisites: Bot. 101, 102, 221.	
Required of juniors in Forestry.	
Environmental control of plant distribution with emphasis upon the habitats and vegetation of North Carolina.	Mr. Wells.
 <b>Bot. 442. Microanalysis of Plant Tissue.</b>	0-3-0
Prerequisites: Bot. 101, 102, 221.	
The identification in plant tissues of mineral elements and organic compounds and the physiological significance of these materials.	Mr. Anderson.

<b>Bot. 443. Soil Microbiology.</b>	0-0-3
Prerequisites: Bot. 101, 102, 221, 402.	
Elective in Agriculture and Forestry.	
The more important microbiological processes that occur in soils: decomposition of organic materials, ammonification, nitrification, and nitrogen fixation.	Mr. Shunk.
<b>Bot. 451. Plant Microtechnique.</b>	3-0-0
Prerequisites: Bot. 101, 102.	
Elective in Agriculture and Forestry.	
Materials and processes involved in the preparation of plant structures for microscopic examination.	Mr. Anderson.
<b>Bot. 452. Advanced Bacteriology.</b>	0-3-0
Prerequisites: Bot. 101, 102, 221, 402.	
Methods used in the bacteriological analysis of water and milk.	
	Mr. Shunk.
<b>Bot. 453. Advanced Plant Ecology.</b>	0-0-3
Prerequisites: Bot. 221, 441.	
Elective in Agriculture and Forestry.	
Practice in the use of the instruments necessary in the study of environmental factors; advanced readings and conferences on plant distribution in relation to these factors.	Mr. Wells.
<b>Bot. 462. Research Methods in Plant Physiology.</b>	0-3-0
Experience in the use of techniques important in physiological research.	
<b>Bot. 463. Advanced Systematic Botany.</b>	0-0-3
Prerequisites: Bot. 101, 102, 203.	
A continuation of the elementary course 203 in the identification of the local flora plants together with a survey of the plant families from the modern phylogenetic point of view.	Mr. Buell.
<b>Bot. 473. Aquatic Biology.</b>	0-0-2
Prerequisites: Bot. 101, 102.	
Required of Sanitary Engineers.	
Identification and control of the aquatic algae and protozoa which give trouble in reservoirs. A survey of the higher water and marsh plants is also included.	Mr. Whitford.

Bot. 481, 482, 483. Pathogenic Fungi.	3-3-3
Prerequisites: Bot. 101, 102.	
Elective.	
Required of seniors in Plant Pathology.	
A study of the structure, identification, and classification of fungi pathogenic on plants.	Mr. Lehman.
Bot. 491. Principles of Plant Pathology.	0-5-0
Prerequisites: Bot. 101, 102, 221, 301 or 303 or equivalent.	
Elective.	
Required of seniors in Plant Pathology.	
An advanced study of the epiphytology and etiology of diseases of plants.	Mr. Lehman.
Bot. 492. Principles of Plant Disease Control.	0-5-0
Prerequisites: Bot. 101, 102, 221, 301 or 303.	
Elective.	
A critical study of the major principles involved in the control of causative agents of diseases of plants, including exclusion, eradication, protection, and immunization.	Mr. Jensen.
Bot. 501, 502, 503. Pathology of Special Crops.	3-3-3
Prerequisites: 301 or 303, 491.	
A comprehensive survey of the literature dealing with diseases of specific crops.	
Diseases of Field Crops.	3-0-0, Mr. Lehman.
Diseases of Fruit Crops.	0-3-0, Mr. Jensen.
Diseases of Vegetable Crops.	0-0-3, Mr. Ellis.
Bot. 511, 512, 513. Bacteriology: Special Studies.	3-3-3
Prerequisites: Bot. 402, 452.	
Special work on restricted groups of bacteria, such as nitrogen bacteria of the soil, milk organisms, and special groups of bacteria in water.	
	Mr. Shunk.
Bot. 521. Advanced Systematic Botany.	3-0-0 or 0-0-3
Prerequisites: Bot. 203.	
An advanced survey of restricted groups of plants involving organization and distribution problems.	Messrs. Wells, Buell.

Bot. 523. Cytogenetics. See F. C. 523.

Bot. 531, 532, 533. Plant Physiology.

3-3-3

Prerequisite: Bot. 221, 432.

Critical study of some particular problem, involving original investigation together with a survey of pertinent literature. Mr. Anderson.

Bot. 541. Plant Ecology.

3-0-0 or 0-0-3

Prerequisites: Bot. 203, 441.

Minor investigations in vegetation-habitat problems accompanied by advanced reference reading. Mr. Wells.

Bot. 551, 552, 553. Research in Botany.

3-3-3

Prerequisite: 30 hours in 100-300 courses in Botany.

Staff.

Bot. 561, 562, 563. Seminar.

1-1-1

Attendance by the student upon the weekly seminar together with the presentation of a paper in his major field of research. Mr. Wells.

## CERAMIC ENGINEERING

### Courses for Undergraduates

Cer. E. 202. Ceramic Materials.

0-3-0

Prerequisite: Geol. 220.

Required of sophomores in Ceramic Engineering.

The origin and occurrence of ceramic raw materials, their chemical and physical properties and system of measuring these. Ries: *Clays Occurrence, Properties, and Uses*. Mr. Stone.

Cer. E. 203. Ceramic and Mining Processes.

0-0-3

Prerequisite: Geol. 220.

Required of sophomores in Cer. E. and Geol. E.

The winning and preparation of ceramic materials; the equipment and processes used in manufacturing ceramic products. Garve: *Factory Design and Equipment*. Mr. Greaves-Walker.

## Courses for Advanced Undergraduates

Cer. E. 301. Drying Fundamentals and Practice.	3-0-0
Prerequisites: Phy. 203, Cer. E. 202.	
Required of Juniors in Cer. E.	
Theory and practice of drying ceramic products; problems. Greaves-Walker: <i>Drying Ceramic Products.</i>	Mr. Greaves-Walker.
Cer. E. 302. Firing Fundamentals and Practice.	0-3-0
Prerequisites: Cer. E. 301.	
Required of juniors in Cer. E.	
The theory and practice of firing ceramic products. Problems. Wilson: <i>Ceramics; Clay Technology.</i>	Mr. Greaves-Walker.
Cer. E. 303. Ceramic Calculations.	0-0-3
Prerequisites: Chem. 212, Cer. E. 302.	
Required of juniors in Cer. E.	
Solution of chemical and physical problems of the ceramic industries. Andrews: <i>Ceramic Tests and Calculations.</i>	Mr. Stone.
Cer. E. 305. Ceramic Products.	0-0-3
Prerequisite: Cer. E. 202.	
Required of juniors in Cer. E.	
Physical, chemical, and artistic requirement of ceramic products. Laboratory practice.	Messrs. Greaves-Walker, Stone.

## Courses for Graduates and Advanced Undergraduates

Cer. E. 401. Pyrometry.	1-0-0
Prerequisite: Cer. E. 302.	
Required of seniors in Cer. E.	
The theory and use of temperature measuring instruments in industry. Wood and Cork: <i>Pyrometry.</i>	Mr. Stone.
Cer. E. 403. Silicates I.	3-0-0
Prerequisites: Chem. 331, Cer. E. 303 and Geol. 338.	
Required of seniors in Cer. E.	
The fundamental principles underlying the composition and production of whitewares, glazes, terra cotta, and abrasives. Hall and Insley: <i>A Compilation of Phase Rule Diagrams.</i>	Mr. Stone.

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Cer. E. 404. Silicates II.

0-3-0

Prerequisites: Chem. 331, Cer. E. 403 and Geol. 338.

Required of seniors in Cer. E.

The fundamental principles underlying the composition and production of refractories, cements, plasters, glasses, and metal enamels. Hall and Insley: *A Compilation of Phase Rule Diagrams*; Andrews: *Enamels*; Scholes: *Modern Glass Practice*.

Mr. Stone.

Cer. E. 405. Refractories.

0-0-3

Prerequisites: Cer. E. 404.

Required of seniors in Cer. E.

Refractory materials and manufacture of refractory products; use of refractory products in industrial furnaces. Norton: *Refractories*.

Mr. Greaves-Walker.

Cer. E. 411, 412, 413. Ceramic Laboratory.

3-3-3

Prerequisites: Cer. E. 303, 305, Corequisite: Cer. E. 403, 404.

Required of seniors in Cer. E.

Advanced practice in producing and determining the chemical and physical properties of ceramic materials and products; thesis.

Mr. Stone.

Cer. E. 414, 415. Ceramic Designing.

0-4-4

Prerequisites: M. E. 213, E. M. 322, Cer. E. 203 and 302.

Required of seniors in Cer. E.

Designing of ceramic equipment and structures. Garve: *Factory Design and Equipment*.  
Messrs. Greaves-Walker, Stone.

Courses for Graduates Only

Cer. E. 501, 502, 503. Designing of Ceramic Equipment and Plants.

3-3-3

Prerequisite: Cer. E. 415.

Advanced study and designing of ceramic machinery, dryers, kilns, and plant structures.

Mr. Greaves-Walker.

Cer. E. 505, 506, 507. Advanced Refractories and Furnaces.

3-3-3

Prerequisite: Cer. E. 413, 405.

Advanced study of refractory materials and products, and their use.

Mr. Greaves-Walker.

Cer. E. 509, 510, 511. Industrial Adaptability of Ceramic Materials. 3-3-3

Prerequisite: Cer. E. 413.

Laboratory investigations to determine the industrial uses to which various North Carolina ceramic materials can be put.

Messrs. Greaves-Walker, Stone.

Cer. E. 513, 514, 515. Ceramic Research. 3-3-3

Prerequisite: Cer. E. 404, 413.

Research problems in ceramics will be assigned to meet the desire of the student for specialization.

Messrs. Greaves-Walker, Stone.

Cer. E. 517, 518, 519. Glass Technology. 3-3-3

Prerequisites: Chem. 331, Geol. 338, Cer. E. 405.

Advanced study of the manufacture and physical properties of glass.

Mr. Greaves-Walker.

Cer. E. 521, 522, 523. Advanced Silicate Technology. 3-3-3

Prerequisite: Cer. E. 404, 413.

Advanced laboratory practice in bodies, glazes, glasses and colors.

Mr. Stone.

## CHEMICAL ENGINEERING

### Courses for Undergraduates

Chem. E. 201, 202, 203. Introduction to Chemical Engineering. 1-1-2

Prerequisites: Chem. 103; Math. 102.

Required of sophomores in Chem. E.

Reactions in chemical processes, illustrative problems, and control methods; elements of unit processes and unit operation; visits to chemical plants, elementary chemical engineering calculations. Randolph: *Introduction to Chemical Engineering*.

Mr. Randolph.

Chem. E. 212, 213. Chemical Nature of Engineering Materials. 0-3-3

Prerequisites: Chem. 103; Math. 103.

Required of seniors in General Engineering; elective for others.

Study of the fundamental facts about the chemical nature of engineering materials as an aid in the proper choice of materials for various engineering purposes under working conditions. *Teachers' Manual*. Mr. Randolph.

## Courses for Advanced Undergraduates

Chem. E. 311, 312, 313. Chemical Engineering I. 3-3-3

Prerequisites: Chem. 213; Chem. E. 201 or Tex. 212.

Required of juniors in Chem. E. and elective for seniors in Textile Chemistry and Dyeing.

Unit processes; inorganic and organic technology; chemical manufacturing processes; introductory unit operations. Reigel: *Industrial Chemistry*; Scroggins: *Organic Unit Processes*; Badger and McCabe: *Elements of Chemical Engineering*; *Teachers' Manual*; and Library References.

Mr. Bright.

Chem. E. 321, 322, 323. Chemical Engineering Laboratory I. 1-1-1

Prerequisite or concurrent: Chem. E. 311, 312, 313.

Required of juniors in Chem. E.

A laboratory study of industrial control methods; visits to industrial plant; problems and processes solved and presented in technical reports; preparation of products on pilot plant scale; cost studies. Notes.

Mr. Bright.

Chem. E. 330. Treatment of Water and Sewage. 3-0-0 or 0-0-3

Prerequisite: Chem. E. 313 or C. E. 215.

Required of juniors in San. E.

Principles involved in the control of municipal water supplies and in sewage treatment; reactions involved; chemical nature of water and sewage treatment; methods for removal of the more objectionable materials in industrial waters. Notes. Messrs. Randolph, Doody.

Chem. E. 331. Industrial Stoichiometry. 3-0-0 or 0-3-0 or 0-0-3

Prerequisite or concurrent: Chem. E. 311.

Required of juniors in Chemical Engineering.

Industrial calculations and measurements; heat balances; material balances, fuels and combustion processes; principles of chemical engineering calculations. Hougen and Watson: *Industrial Chemical Calculations*.

Messrs. Doody, Bright.

## Courses for Graduates and Advanced Undergraduates

**Chem. E. 5401. Pilot Plant Practice.** 3 credits

Prerequisites: Chem. E. 312, Chem. E. 323, Chem. 213.

Required of Junior Chemical Engineering students and elective for others. To be given during two weeks immediately preceding the opening of the fall term in September.

Practical application of chemical machinery and chemical testing methods. Pilot plant examination of chemical processes. Cost estimation and process development through pilot plant studies. Reference: current technical journals, lectures and notes. Messrs. Doody, Randolph.

**Chem. E. 411, 412, 413. Principles of Chemical Engineering.** 3-3-3

Prerequisite: Chem. E. 313; concurrent with Chem. 431.

Fundamental principles of Chemical Engineering; unit operations; Chemical Engineering calculations; design and efficiency of chemical machinery and equipment. Walker, Lewis, McAdams, and Gilliland: *Principles of Chemical Engineering*; Badger and McCabe: *Elements of Chemical Engineering*. Messrs. Doody, Bright.

**Chem. E. 421. Water Treatment.** 3-0-0 or 0-3-0 or 0-0-3

Prerequisite: Chem. E. 311.

Required of seniors in Chem. E. Elective for others.

Water supplies; equipment and practice in filter plants; water purification and softening; filters; water examination; treatment of water for domestic and industrial uses. Notes. Mr. Randolph.

**Chem. E. 422. Chemistry of Engineering Materials.** 3 or 3 or 3

Prerequisite: Chem. E. 311.

Required of seniors in Chem. E.

Technical study of engineering materials for engineering and industrial uses; effects of conditions of extraction, production, and consequent treatment to their suitability for required uses. Leighou: *Chemistry of Engineering Materials*; White: *Engineering Materials*. Mr. Bright.

**Chem. E. 423. Electrochemical Engineering.** 3-3-3 or 0-0-3

Prerequisite: Chem. E. 311.

Required of seniors in Chem. E.

Theory and practice of electrochemical industries; principles of electrolysis and other electrochemical processes; electric furnace; electro-thermal operations, electrometallurgy. Mantell: *Industrial Electrochemistry*.

Mr. Doody.

**Chem. E. 425. Gas Engineering.**

3 or 3 or 3

Prerequisite: Chem. E. 311.

Elective for seniors or graduates in Chem. E.

Gas engineering; manufacture of industrial fuel gases and their distribution; apparatus and equipment; plant design; general practice in gas plants; by-products, pipe lines, service connections, gas meters.

Mr. Randolph.

**Chem. E. 426. Sanitation Processes.**

0-0-3

Prerequisite: Chem. E. 311, or C. E. 383.

Technical study of the methods of sanitation in industrial plants; equipment and practice in the disposal and treatment of waste materials and sewage; measures necessary in eliminating occupational disease hazards.

*Notes.*

Mr. Randolph.

**Chem. E. 427. Industrial Application of Physical Chemistry.**

3-0-0

Prerequisite: Chem. E. 311, or Chem. 331.

Special phases of physical chemistry studied technically with reference to the practical application of these principles in the chemical industries such as industrial catalysis, evaporation principles, absorption, equilibrium, applications of phase rule, physical metallurgy, colloids. *Notes.*

Mr. Doody.

**Chem. E. 428. Fuel and Combustion Engineering.**

0-3-0

Prerequisite: Chem. E. 311.

Principles and mechanism of the combustion reactions; quantitative application to problems of design or use of equipment for fuel processing and utilization; solid, liquid, and gaseous fuels, with complete methods of analysis. Haslam and Russell: *Fuels and Their Combustion.* Mr. Bright.

**Chem. E. 431, 432, 433. Chemical Engineering Laboratory and Design II.**

2-2-2

Prerequisite or concurrent: Chem. E. 411, 412, 413.

Required of seniors in Chem. E.

A laboratory study of measurement of flow of fluids and heat; crushing and grinding, distillation; evaporation; drying; humidity; filtration and mechanical separation; absorption and extraction; calculations; design and construction of equipment for these fundamental unit operations in chemical industry.

Messrs. Doody, Bright.

**Chem. E. 434. Chemical Engineering Design.** 0-0-3

Prerequisite: Chem. E. 411, 412.

Location, layout, and complete design of the chemical plant and its process equipment; materials of construction; economic factors controlling the chemical industry, and optimum design from the standpoint of economic return, process development, pilot-plant production studies. *Notes.*

Mr. Doody.

**Chem. E. 435. Industrial Oil, Fats and Waxes.** 0-0-3 or 3-0-0

Prerequisite: Chem. E. 313.

Elective for juniors or seniors in Chem. E.

Petroleum engineering; manufacture, refining, and conversion of animal and vegetable oils and their by-products; lubricants. Mr. Randolph.

**Chem. E. 441. Chemical Engineering Thermodynamics.** 3 or 3 or 3

Prerequisite or concurrent: Chem. E. 411, 412, 413.

A study of the thermal properties of matter and energy relationships underlying chemical processes. Fundamental laws of energy as applied to Chemical Engineering problems and processes in industry. Mr. Doody.

**Chem. E. 436. Cellulose and Allied Industries.** 3-0-0

Prerequisite or concurrent: Chem. E. 311 or Forestry 206, 207.

Elective.

Chemical nature of Cellulose and its compounds. Methods and processes and engineering design for pulp and paper.

**Chem. E. 437. Cellulose and Allied Industries.** 0-3-0

Prerequisite or concurrent: Chem. E. 311 or Forestry 206, 207.

Elective.

Cellulose chemical conversion products. Methods and processes and engineering design for plastics, rayon, cellophane, explosives, paints, and varnishes.

**Chem. E. 438. Corrosion: Causes and Prevention.** 0-0-3

Prerequisite: Chem. E. 313.

Theories of corrosion; influences of metal composition and manufacture; chemical corrosion; prevention of corrosion; comparison of corrosive resisting materials for chemical and industrial uses. Speller: *Corrosion; Causes and Prevention.* Mr. Bright.

Chem. E. 439. Chemical Principles.	3 or 3 or 3
Prerequisite or concurrent: Chem. E. 313.	
Fundamental principles in chemical manufacture and correlation of these principles in unit processes and operation. Hougen and Watson: <i>Industrial Chemical Calculations. Notes.</i>	Mr. Doody.
Chem. E. 440. Metals and Alloys.	0-3-0
Prerequisite: Chem. E. 422 or M. E. 131.	
Elective for seniors or graduates.	
Relation of chemical composition and crystalline structure to the properties of metals and alloys; technical study of the composition and structure of metals for chemical and industrial uses. <i>Teacher's Manual.</i> Mr. Bright.	
<b>Courses for Graduates Only</b>	
Chem. E. 501. Chemical Technology—Advanced.	3-3-3
Prerequisite: Chem. E. 413.	
An advanced course in problems, processes, and methods of chemical manufacture and production; special study in applied inorganic, applied organic chemistry, and research in applied chemistry.	Staff.
Chem. E. 502. Industrial Chemical Research.	3-3-3
Prerequisite: Chem. E. 413.	
Chemical research on some industrial problem relating to North Carolina resources; practice in industrial plants, control analyses, estimate of losses, costs, data sheets, technical report.	Staff.
Chem. E. 503. Chemical Engineering Research.	3-3-3
Prerequisite: Chem. E. 413.	
Some plant problem studied exhaustively by making investigations at the chemical plant, and by supplementary experiments and research in the laboratory; measurements, tabulation, graphs, calculation of some actual plant problem, and Pilot plant research problems.	Staff.
Chem. E. 504. Advanced Chemical Engineering.	3-3-3
Prerequisites: Chem. E. 411, Chem. E. 433.	
Advanced study of process equipment, theory, and practice in operation and design for unit operations; Chemical Engineering thermodynamics; coefficients of heat transfer; heat of reactions; evaporators; stills; condensers, and heat exchangers; interrelations between heat transfer and fluid friction. McAdams: <i>Heat Transmission</i> and other texts.	Staff.

**CHEMISTRY****Courses for Undergraduates**

**Chem. 101, 102, 103. General Inorganic Chemistry.** 4-4-4

Recitations and laboratory work; theories of laws, history, occurrence, preparation, properties, and uses of the more important elements and their compounds; formulae, valence, equations and calculations.

Messrs. Reid, Jordan, Morgan, Satterfield, Showalter, Loeppert, White, Wilson.

**Chem. 211. Qualitative Analysis.** 4-0-0

Prerequisites: Chem. 101, 102, 103.

Required of sophomores in Ceramic, Chemical, and Mining Engineering and those majoring in chemistry and of juniors in Textile Chemistry and Dyeing.

Identification and separation of more common ions and analysis of mixture of salts of commercial products.

Messrs. Wilson, Reid, Loeppert.

**Chem. 212. Quantitative Analysis.** 0-4-0

Prerequisite: Chem. 211.

Required of sophomores in Ceramic Engineering, Chemistry, Chemical Engineering, and of juniors in Textile Chemistry and Dyeing.

Volumetric Analysis: Alkalinity, acidimetry, oxidation, and iodometric titrations.

Messrs. Wilson, Reid, Loeppert.

**Chem. 213. Quantitative Analysis.** 0-0-4

Prerequisite: Chem. 211.

Required of sophomores in Chemical Engineering.

A continuation of Chem. 212. Gravimetric methods. Substances of more difficult nature are analyzed, as minerals, steel, alloys, limestone, Paris green, etc.

Messrs. Wilson, Reid, Loeppert.

**Chem. 221. Introduction to Organic Chemistry.** 4-0-0 or 0-4-0 or 0-0-4

Prerequisites: Chem. 101, 102, 103.

Required of sophomores in Agriculture. Elective for others.

Hydrocarbons, alcohols, aldehydes, ketones, acids, ethers, esters, amino-acids, and benzene derivates; carbohydrates, fats, proteins, and related compounds.

Mr. Reid.

**Chem. 223. Quantitative Analysis.**

0-0-4

Required of students in Textile Chemistry and Dyeing.

A continuation of Chem. 212. Substances of more difficult nature are analyzed, as sulphites, sulphides, bleaching powder, Turkey-red oil, soaps.

Messrs. Wilson, Reid, Loeppert.

**Chem. 233. Quantitative Analysis.**

0-0-4

Continuation of Course 212, along with gravimetric methods used in the analysis of magnesium, phosphate rock, fertilizer and insecticide.

Messrs. Wilson, Reid, Loeppert.

**Chem. 242. Chemical Calculations.**

0-3-0 or 0-0-3

Prerequisites: Chem. 101, 102, 103.

Chemical problems, especially in analytical work; lectures on principles, theories, laws, upon which the problems are based; assigned problems for discussion.

Mr. White.

**Chem. 331. Physical Chemistry.**

5-0-0

Prerequisites: Chem. 101, 102, 103.

Required of Cer. E.; elective to others.

Fundamental chemical principles from a physiochemical viewpoint; special attention to silicate analysis, colloids, and phase rule.

Mr. Sutton.

**Courses for Graduates and Advanced Undergraduates****Chem. 401. Historical Chemistry.**

2-0-0

Prerequisites: Chem. 101, 102, 103.

Development of Chemistry and the history of men instrumental in the progress of Chemistry.

Mr. Williams.

**Chem. 402, 403. Theoretical Chemistry.**

0-2-2

Prerequisites: Chem. 101, 102, 103.

Atoms and molecules; chemical reactions and conditions influencing them; electronic conception of valence, radio activity.

Mr. Jordan.

**Chem. 411. Advanced Qualitative Analysis.**

4-0-0

Prerequisite: Chem. 211 or its equivalent.

Lectures and laboratory work dealing with the analysis of alloys and complex mixture.

Mr. Wilson.

**Chem. 412. Advanced Quantitative Methods.** 0-3-0 or 0-0-3

Prerequisite: Chem. 213 or its equivalent.

Methods and apparatus in advanced quantitative analysis; heat of combustion, colorimetry, complete analysis of ores, special steels, paint pigments and alloys. Mr. Wilson.

**Chem. 421, 422, 423. Organic Chemistry.** 4-4-4

Prerequisites: Chem. 101, 102, 103.

Required of juniors in Chemical Engineering, Chemistry, and seniors in Textile Chemistry and Dyeing. Elective for others.

Aliphatic and aromatic compounds; practical applications; methods of preparation and purification of compounds, and their structures.

Mr. Williams.

**Chem. 424. The Chemistry of Hydrocarbons and Their Derivatives.** 0-3-0 or 0-0-3

Prerequisites: Chem. 421, 422, 423.

New developments in solvents, resins, detergents, synthetic rubber, motor fuels. Mr. Reid.

**Chem. 431, 432, 433. Physical Chemistry.** 4-4-4 or 4-4-0

Prerequisite: Chem. 213.

The first two terms only required of Chemical Engineers; elective for Agricultural Chemistry students.

Principles of Physical Chemistry; laws and theories, application to various branches of chemistry and to industrial processes. Mr. Sutton.

**Chem. 441. Food Products and Adulterants.** 3-0-0 or 0-3-0

Prerequisites: Chem. 221 or 421, 422, 423.

Designed for students in all schools.

Food principles; cereals, starches, sugars, fats; milk and milk products; the packing house; food preservation; beverages, spices and condiments; food legislation, food advertising. Mr. Satterfield.

**Chem. 442. Chemistry of Colloids.** 0-3-0

Prerequisites: Chem. 221 or 421, 422, 423.

Colloidal behavior, osmotic pressures, dialysis, sols and gels, membranes and membrane equilibria, proteins, and Donnan equilibrium. Mr. White.

**Chem. 451, 452. Physiological Chemistry.** 3-3-0

Prerequisites: Chem. 221 or 421, 422, 423.

Essential chemical facts pertaining to life processes; digestion, absorption, metabolism, secretions, and excretions; lectures, laboratory.

Mr. Satterfield.

**Chem. 462. Chemistry of Vitamins.** 3-0-0 or 0-3-0 or 0-0-3

Prerequisites: Chem. 221 or 421, 422, 423.

Required of juniors in Animal Prod.

Application of vitamin hypothesis to human nutrition; history, nomenclature, properties, distribution, effects of deficiencies, vitamin values.

Mr. Satterfield.

**Chem. 472. Blood Analysis.** 0-3-0 or 0-0-3

Prerequisites: Chem. 212 and 421, 422, 423.

Hemoglobin, sugar, urea, uric acid, cholesterol, creatine, creatinine, non-protein, nitrogen, amino-acid nitrogen, calcium. Folin-Wu system is emphasized; lectures and laboratory.

Mr. Satterfield.

**Chem. 481. Agricultural Chemistry.** 3-0-0

Prerequisites: Chem. 101, 102, 103, and 221 or 421, 422, 423.

Feeding the plant; insecticides and fungicides; transforming the plant into human food and animal food; composition of plants; relation between composition and uses.

Mr. Satterfield.

**Chem. 482, 483. Food and Nutrition.** 0-3-3

Prerequisites: Chem. 221 or 421, 422, 423.

Open to all students desiring a practical knowledge of the subject.

Carbohydrates, fats, proteins, amino-acids, minerals, fiber, vitamins, enzymes; nutritive value of food materials; digestion, food idiosyncrasy; acidosis and alkalosis.

Mr. Satterfield.

**Chem. 491, 492, 493. Advanced Physical Chemistry.** 3-3-3

Prerequisites: Chem. 431, 432, 433.

An advanced problem course designed for chemical engineers.

Mr. Sutton.

## Courses for Graduates Only

**Chem. 501, 502, 503. Organic Chemistry, Advanced.** 3-3-3

Prerequisites: Chem. 421, 422, 423.

Principles of organic chemistry; current literature; laboratory work and preparation in quantity. Mr. Williams.

**Chem. 511. Organic Qualitative Analysis.** 3-0-0

Prerequisites: Chem. 421, 422, 423.

Detection of elements and radicals, group characteristics.

Mr. Williams.

**Chem. 512. Organic Quantitative Analysis.** 0-3-0

Prerequisites: Chem. 212, 421, 422, 423.

Analysis of organic compounds for carbon, hydrogen, nitrogen, the halogens, sulfur. Mr. Williams.

**Chem. 513. Micro-Analysis.** 0-0-3

Prerequisites: Chem. 421, 422, 423.

Tests for compounds, and impurities in quantities too small to be detected by ordinary methods. Mr. Williams.

**Chem. 523. Micro-Chemical Analysis.** 3-0-0 or 0-3-0 or 0-0-3

Prerequisite: Chem. 213.

Inorganic micro qualitative analysis; fibers, starches, etc. Mr. Wilson.

**Chem. 531, 532, 533. Chemical Research.** 3-3-3

Prerequisite: 54 term credits in Chemistry. Open to all graduates.

Special problems that will furnish material for a thesis. Staff.

**Chem. 541, 542, 543. Seminar.** 1-1-1

Required of graduate students specializing in Chemistry.

Preparation and presentation of abstracts of current publications in the field of Chemistry.

**Chem. 552, 553. Biochemistry.** 0-3-3

Prerequisites: Chem. 421, 422, 423, 482, 483.

Special topics in Biochemistry.

Mr. Satterfield.

## CIVIL ENGINEERING

## Courses for Undergraduates

## C. E. 101, 102, 103. Drawing.

1-1-1

Required for freshmen in Forestry and Landscape Architecture.

Plain lettering, common symbols, platting of areas from compass-survey notes furnished, filling in contours from notes furnished, tracing, calculation of areas by planimeter; finished maps. Sloane and Montz: *Elementary Topographic Drawing*.  
Mr. Lambe.

## C. E. s200. Surveying.\*

3 credits

Prerequisite: Math. 102.

Required in the summer immediately following the freshman year in Aero. E., Agr. Eng., A. E., Cer. E., E. E., Gen. E., and M. E.

The use, care and adjustment of surveying instruments; elementary land surveying, traverse lines, leveling, topographical surveying and stadia measurements. Tracy: *Plane Surveying*.  
Staff.

## C. E. 221, 222, 223. Theoretical Surveying.

3-3-3

Prerequisite: Math. 102.

Required of all sophomores in Civil Engineering. C. E. 221, 222 required in Forestry (0-3-3), in Geol. Eng., Landscape Architecture, and Wildlife Conservation and Management (3-3-0).

Use, care and adjustment of surveying instruments, land surveying, topographical surveying, leveling and theory of stadia measures, plane table, etc.

Third term, railroad surveys, including simple, compound, reverse, and spiral curves, turnouts, etc. Davis and Foote: *Surveying*. Rubey: *Route Surveys*.  
Staff.

## C. E. 224. Topographic Drawing.

0-0-1

Prerequisites: C. E. 101, 102, 103.

Required of sophomores in Forestry.

Plotting by coördinates; contours and general topography. Notes.

Staff.

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\* Note.—Two sessions: (a) Full time, 3 weeks immediately following close of College third term; (b) half time, 6 weeks concurrently with College Summer School term in order to allow students to schedule summer school work.

**C. E. 225, 227. Field Surveying.** 1-0-1

To be taken concurrently with C. E. 221, 223.

Required of all sophomores in Civil Engineering and Landscape Architecture. C. E. 225 required in Geol. E. and Wildlife Conservation and Management (1-0-0), and in Forestry (0-1-0).

Surveying field practice, topographical surveys, railroad and highway curves. Profiles, cross-sections. Staff.

**C. E. 226. Mapping.** 0-1-0

Prerequisites: M. E. 105, 106. To be taken concurrently with C. E. 222.

Required of all sophomores in Civil Engineering, and juniors in Geological Engineering.

Practice in conventional signs and lettering. A complete topographical map and tracing is to be made involving the use of three methods of contour location. Field notes to be furnished. Mr. Lambe.

**C. E. 281. Mill and Mill Village Sanitation.** 3-0-0

Prerequisite: Chem. 103.

Mill and mill village water supply and sewage disposal, mosquito and fly control, sanitary milk supply, industrial hygiene. Course for textile students. Ehlers and Steele: *Municipal and Rural Sanitation*. Mr. Stiemke.

### Courses for Advanced Undergraduates

**C. E. s300. Surveying and Mapping.** 3 credits

Prerequisites: C. E. 221, 222; C. E. 224.

Required in summer immediately following sophomore year in Forestry.

Boundary; topographical surveys, and calculations of sections of College Experimental Forestry Lands. Finished section maps. Davis and Foote: *Surveying*. Staff.

**C. E. s310. Advanced Surveying.\*** 3 credits

Prerequisites: C. E. 221, 222, 223; C. E. 226.

Required in the summer immediately following the sophomore year in Civil Engineering and Landscape Architecture.

Plane table practice, special problems in surveying practice; triangulation, railroad and highway spirals; hydrographic surveying with sextant; plane table problems; the use and rating of current meters; measurement of stream flow; drainage problems.

Laying out proposed construction work. Topographic details and special problems. Davis and Foote: *Surveying*. Staff.

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\* Note.—Two sessions: (a) Full time, 3 weeks immediately following close of College third term; (b) half time, 6 weeks concurrently with College Summer School term in order to allow students to schedule summer school work.

## C. E. 321. Materials of Construction.

3 or 3 or 3

Prerequisite: Junior standing.

Required of all juniors in Civil Engineering, M. E., Aero. E. and A. E., and of seniors in I. E.

The study of materials used in buildings and other engineering structures, with particular reference to their methods of manufacture and physical properties. Two periods lecture and recitation; one period laboratory. Tucker: *Laboratory Manual in the Testing of Materials*. Mills: *Materials of Construction*.

Messrs. Babcock, Ray.

## C. E. 322, 323. Materials Testing Laboratory.

0-1-1

Prerequisite: C. E. 321.

Required of seniors in General Civil, Sanitary, and Transportation Engineering, and one term only for juniors in Architectural and Ceramic Engineering.

The testing of materials used in construction. Tucker: *Manual in the Testing of Materials*.

Mr. Ray.

## C. E. 343. Hydraulic Structures.

0-0-3

Prerequisite: E. M. 330.

Required of juniors in General Civil, Sanitary, and Transportation Engineering.

Application of the fundamentals of Fluid Mechanics to problems in Hydraulic Engineering; flow in pipes, in canals and natural water courses; design of locks and dams for navigation; flood control and power development; theory of design, installation and operation of pumps and hydraulic motors.

Mr. Stiemke.

## C. E. 362, 363. Construction Engineering I.

0-3-3

Prerequisite: E. M. 311.

Required of juniors in Construction and Building Materials Engineering.

Building codes, zoning ordinances; quantity surveys; timber properties, grading, identification, use, and preservation; frame construction; timber design. Huntington: *Building Construction; Notes and Trade Literature*.

Mr. Bramer.

C. E. 365, 366. Sanitary and Mechanical Equipment of Buildings. 3-3-0

Prerequisites: E. M. 311, 312.

First term required of juniors in Construction and Building Materials Engineering. First and second terms required of juniors in Arch. E.

A study of water supply, soil, waste, and vent-pipe systems, principles and practice of heating and ventilating and a discussion of various other mechanical equipment of a building, such as elevators, dust-collecting systems, etc. Gay and Fawcett: *Mechanical and Electrical Equipment of Buildings*.  
Mr. Stiemke.

C. E. 367. Specifications. 0-0-3

Prerequisite: C. E. 321.

Required of juniors in Construction and Building Materials Engineering.

Preparation of specifications and legal documents for building operations.  
Kirby: *Elements of Specification Writing*. Mr. Bramer.

C. E. 372, 373. Transportation Engineering I. 0-3-3

Prerequisite: C. E. 221, 222, 223.

Required of juniors in General Civil, Sanitary, and Transportation Engineering.

General design, construction, and maintenance of highways, railroads, and airports. Mr. Babcock.

C. E. 383. Sanitary Engineering. 0-0-3

Prerequisite: Chem. 103.

Required of juniors in San. E.

Water supply and sewage disposal; ventilation; mosquito and fly control; refuse disposal; public health laws and organization. Ehlers and Steele: *Municipal and Rural Sanitation*. Mr. Stiemke.

#### Courses for Graduates and Advanced Undergraduates

C. E. 421, 422. Reinforced Concrete. 3-3-0

Prerequisites: E. M. 313, 322.

Required of all seniors in Civil Engineering and Architectural Engineering.

Derivation of formulas used in reinforced concrete design, use of diagrams and curves. Illustrative problems in design. Turneaure and Maurer: *Principles of Reinforced Concrete Construction*. Messrs. Mann, Bramer.

## C. E. 423, 424, 425. Graphic Statics.

1-1-1

Prerequisite: E. M. 313.

First term required of all seniors in Civil Engineering. First, second, and third terms required of all seniors in Architectural Engineering.

Principles involved in the solution of problems by graphical methods. Moments, shears. Resultant pressure on retaining walls. Stress diagrams. Fairman and Cutshall: *Graphic Statics* and assigned references.

Mr. Mann.

## C. E. 426, 427. Structural Design.

0-3-3

Prerequisites: E. M. 322, C. E. 431.

Required of all seniors in Civil Engineering and Architectural Engineering.

Design of beams, columns, tension members, plate girders, trusses and structures. Bishop: *Structural Design*.

Mr. Mann.

## C. E. 431, 432. Theory of Structures.

3-3-0 or 0-3-3

Prerequisite: E. M. 322.

Required of all seniors in Civil Engineering and General Engineering.

Roof trusses; bridge trusses; three hinged arch, lateral bracing and portals; rigid frame, wind stresses in tall buildings, indeterminate trusses, secondary stresses. Spofford: *Theory of Structures*.

Mr. Bramer.

## C. E. 431a, 432a. Theory of Structures (abridged).

3-3-0

Prerequisite: E. M. 322.

Required in Architectural Engineering, C. E. 431, 432, to be required if less than five students enroll for C. E. 431a, 432a.

Stress analyses and designs of wooden and steel roof trusses; wood, steel, and reinforced concrete floor systems. Theory and design of columns, footings, retaining walls. Theories for wind stress design in tall buildings. Shedd and Vawter: *Theory of Simple Structures*.

Mr. Bramer.

## C. E. 435. Soil Mechanics.

0-0-3

Prerequisites: E. M. 321, 322.

Required of seniors in General, Civil, Sanitary, and Transportation Engineering.

The classification of soils, their physical characteristics and tests; the suitability of certain types of soils for foundations; methods of stabilizing soils; general principles involved in selection of soils for foundations.

Messrs. Babcock, Bramer.

## C. E. 449. Hydrology.

0-0-3

Prerequisite: E. M. 330.

Elective for seniors in Engineering.

The study of the science of the occurrence, distribution and use of water upon the earth with particular reference to North Carolina, including precipitation, evaporation, transpiration, seepage, runoff and stream flow.  
 Myer: *Elements of Hydrology.*

Mr. Stiemke.

## C. E. 453. Applied Astronomy.

4-0-0

Prerequisite: C. E. s310.

Required of seniors in General Civil and Transportation Engineering.

The application of astronomy in determining latitude, azimuth, longitude and time; astronomical observations with transit and sextant; reduction of observations. One credit given for observations. Hosmer: *Applied Astronomy.*

Messrs. Babcock, Bramer.

## C. E. 455. Aerial Surveying.

0-0-3

Prerequisite: C. E. s310.

Required of seniors in General Civil.

A study of various methods of constructing topographical maps from horizontal, vertical, and oblique photographs, and different methods of control of Aerial Surveys. The work covered is confined to the methods of producing maps from photographs and does not take up the technical work of photography or piloting. Bagley: *Aerophotography and Aerosurveying.*

Mr. Babcock.

## C. E. 461, 462, 463. Construction Engineering II.

3-3-3

Prerequisite: C. E. 362, 363.

Required of seniors in Construction and Building Materials Engineering.

Estimating frame, masonry, and reinforced concrete buildings; design and construction of concrete formwork; study of reinforced concrete and steel-framed structures; cost analysis, organization, and management of construction plants; prefabricated construction. Huntington: *Building Construction; Notes and Trade Literature.*

Mr. Bramer.

## C. E. 471, 472. Transportation Engineering II.

3-3-0

Prerequisite: C. E. 372, 373.

Required of seniors in General Civil and Transportation Engineering.

Transportation systems—their development, operation, control, and use.

Mr. Babcock.

C. E. 473. Transportation Design.	2-0-0
Prerequisite: C. E. 372, 373.	
Required of seniors in Transportation Engineering.	
Design of highways, highway intersections, airports, and allied transportation facilities.	Mr. Babcock.
C. E. 474, 475. Highway Engineering.	0-3-3
Prerequisite: C. E. 372, 373.	
Required of seniors in Transportation Engineering.	
Highway administration and finance; economic location of highways; the motor vehicle and its operation; traffic regulation and control.	
	Mr. Babcock.
C. E. 481, 482. Sanitary Engineering Laboratory.	1-1-0
Concurrent with C. E. 485, 486.	
Required of seniors in General Civil and Sanitary Engineering.	
Laboratory analysis of sewage and sludge. Inspection trips to sewage disposal plants. Laboratory analysis for determining quality and safety of water. Inspection of waterworks in various cities. Notes.	Mr. Stiemke.
C. E. 483. Financing of Sanitary Utilities.	0-0-3
Prerequisites: Math. 303, C. E. 383.	
Required of seniors in Sanitary Engineering.	
Rates and service charges, collections, operating cost control, bond issues, and budgets.	Mr. Stiemke.
C. E. 485. Waterworks.	3-0-0
Prerequisite: E. M. 330.	
Required of seniors in General Civil and Sanitary Engineering.	
Municipal waterworks; quantity; sources of supply; collection; purification; distribution. Babbitt and Doland: <i>Water Supply Engineering</i> .	
	Mr. Stiemke.
C. E. 486. Sewerage.	0-3-0
Prerequisite: E. M. 330.	
Required of seniors in General Civil and Sanitary Engineering.	
Separate and combined sewer system; principles of design and construction; sewer appurtenances; disposal plants. Metcalf and Eddy: <i>Sewerage and Sewage Disposal</i> .	Mr. Stiemke.

C. E. 488. Water Purification.	0-3-0
Prerequisites: E. M. 330, C. E. 485.	
Required of seniors in Sanitary Engineering.	
Design and operation of water purification plants; sedimentation, coagulation, filtration, and sterilization of water. Recent treatment processes. Inspection trips to various plants. Babbitt and Doland: <i>Water Supply Engineering</i> .	Mr. Stiemke.
C. E. 489. Sewage Disposal.	0-0-3
Prerequisite: C. E. 486.	
Required of seniors in Sanitary Engineering.	
Design and operation of sewage disposal plants ;treatment processes and devices; efficiencies and costs of plants; public health, legal and economic problems involved. Inspection trips to disposal plants. Metcalf and Eddy: <i>Sewerage and Sewage Disposal</i> .	Mr. Stiemke.
<b>Courses for Graduates Only</b>	
C. E. 525, 526, 527. Advanced Structural Design.	3-3-3
Prerequisites: C. E. 426, 427.	
Analysis and design of fixed, hinged and multispan arches. Complete designs of steel and reinforced concrete structures. MacCullough and Thayer: <i>Elastic Arch Bridges</i> .	Mr. Bramer.
C. E. 531, 532, 533. Advanced Structural Theory.	3-3-3
Prerequisites: C. E. 431, 432.	
Stress analysis in continuous frames and arches; secondary stresses; wind stresses and space frame-work. Analyses by use of Beggs' Defor-meter. Sutherland and Bowman: <i>Advanced Structural Theory</i> .	Mr. Bramer.
C. E. 561, 562, 563. Construction Engineering Research.	3-3-3
Prerequisites: C. E. 461, 462, 463.	
Study of recent advancement and developments in Construction. Original research.	Mr. Bramer.
C. E. 573, 574, 575. Transportation Engineering Research.	3-3-3
Prerequisite: Eighteen term credits in Transportation Engineering.	
A study of the recent developments and advancements in the fields of railway, highway, and air transportation. At least one term is devoted to original research.	Mr. Babcock.

C. E. 577, 578, 579. Advanced Transportation Engineering. 3-3-3

Prerequisite: Eighteen term credits in Transportation Engineering.

A continuation of the undergraduate subjects in Transportation Engineering with particular emphasis on the operation and regulation of the transportation systems of the United States. Mr. Babcock.

C. E. 581, 582, 583. Sanitary Engineering Research. 3-3-3

Prerequisites: C. E. 383, 488, 489.

In the first term, a study of recent developments and research in Sanitary Engineering is made from current literature. In the second term, a research problem is selected and data on the problem are compiled from literature. In the third term, individual research is done. Mr. Stiemke.

C. E. 585, 586. Advanced Sewage Disposal. 3-3-0

C. E. 588, 589. Advanced Water Purification. 0-3-3

## ECONOMICS

### Courses

Econ. 201, 202, 203. General Economics. 3-3-3

Required of sophomores in E. E., Ind. E., Occ. Inf. & Guid., juniors in Arch. E., Cer. E., C. E., Gen. E., Ind. Arts Educ., Tex., seniors in Aero. E., Arch., Chem. E., Geol. E., M. E. Econ. 201,2 required of sophomores in Agr., and Teachers of Agr.

A study of economic institutions and general principles governing production and distribution of wealth under the existing economic organization.

Messrs. Brown, Green, Leager, Moen, Shulenberger, and Wood.

Econ. 205. Introduction to Economics. 3-0-0 or 0-3-0 or 0-0-3

Required of students in Forestry, Land. Arch., and Ind. Arts.

The business aspects and economic organization of society; production, distribution, and value of economic goods. Mr. Green.

Econ. 212. Accounting for Engineers. 3-0-0 or 0-3-0

Required of juniors in Transportation Option of C. E., and seniors in L. A., and E. E.

A survey of accounting principles; financial statements, their construction, use, and interpretation. Mr. Shulenberger.

**Econ. 301, 302, 303. Principles of Accounting.** 3-3-3

Required of juniors in Ag. Econ., Ind. E., Tex. Mgt., and seniors in Gen. E. Econ. 301, 302 required of juniors in Const. and Bldg. Materials Option of C. E., and in Yarn Mfg.

Fundamental principles of theory and practice; interpretation of the structure, form, and use of business statements. Mr. Shulenberger.

**Econ. 305. Business Organization.** 0-3-0

Prerequisites: Econ. 201, 202, 203 or 205.

Required of seniors in Transportation Option of C. E.

Forms of business enterprises; single enterprises, partnerships, joint-stock companies and corporations; principles of business management.

Mr. Green.

**Econ. 307. Business Law.** 3-0-0 or 0-3-0 or 0-0-3

Prerequisite: Junior standing.

Required of juniors in Aero. E., Arch. E., Cer. E., Transportation Option of C. E., M. E., Ind. Arts Educ., seniors in An. Prod., Ind. E., and fifth year in Arch. Messrs. Green and McMillan.

Sources of law; fields of law; contracts, agency, sales; negotiable documents; the law as it controls business transactions.

Messrs. Green and McMillan.

**Econ. 308. Advanced Business Law.** 0-0-3

Prerequisite: Econ. 307.

A continuation of Economics 307, including bailments, suretyship, real property; corporations; recent developments in State and Federal Law.

Mr. Green.

**Econ. 311, 312, 313. Marketing Methods and Sales Management.** 3-3-3

Prerequisites: Econ. 201, 202, 203 or 205.

Required of seniors in Tex. Mgt.; Econ. 311, 312 required of juniors in Farm Mkt., and Farm Fin.; Econ. 311, 312 or Econ. 320 and Econ. 331 required of seniors in Const. and Bldg. Materials Option of C. E.

Marketing functions, agencies, systems; retailing; marketing analysis; problems in marketing; elements of sales management. Mr. Moen.

**Econ. 315. Advertising.** 0-0-3

Prerequisites: Econ. 201, 202, 203.

Principles of advertising.

Mr. Moen.

**Econ. 318. Money and Credit.**

3-0-0

Prerequisites: Econ. 201, 202, 203 or 205.

The functions, history, and development of money and credit; contemporary policies and relation to prices; interrelations of money and credit in banks and financial institutions.

Mr. Moen.

**Econ. 319. Modern Banking.**

0-3-0

Prerequisites: Econ. 201, 202, 203 or 205.

Origin and development of banking in the United States; functions and operations of the modern bank; banking laws; Federal Reserve System.

Mr. Moen.

**Econ. 320. Corporation Finance.**

0-0-3

Prerequisites: Econ. 201, 202, 203.

Alternate requirement in Const. and Bldg. Materials Option of C. E.

Raising and spending of funds and standards of control.

Mr. Moen.

**Econ. 325, 326. Industrial Management.**

3-3-0

Prerequisites: Econ. 201, 202, 203.

Required of seniors in Textiles, elective for all others.

Principles and techniques of modern scientific management; relationship of finance, marketing, industrial relations, accounting, and statistics to production; techniques regarding specific problems; analysis of economic, political, and social influences on production.

Mr. Wood.

**Econ. 331. Labor Problems.**

3-0-0

Prerequisites: Econ. 201, 202, 203 or 205.

Required of juniors in Ind. Educ., and seniors in Ind. Arts Educ. Alternate requirement in Const. and Bldg. Materials Option of C. E.

An economic approach to labor problems, including such topics as insecurity, wages, hours, working conditions, substandard workers, legislation aimed at correcting existing evils.

Mr. Wood.

**Econ. 332. Industrial Relations.**

0-3-0

Prerequisites: Econ. 201, 202, 203.

History, organization, activities, and policies of organized labor; legal aspects, recent developments.

Mr. Wood.

Econ. 333. Personnel Management.	3-0-0 or 0-3-0 or 0-0-3
Prerequisites: Econ. 201, 202, 203 or 205.	
Required of seniors in Const. and Bldg. Materials Option of C. E., and Tex.	
Emphasis on the human problems of industry. A review of the scientific techniques and results of research regarding the problems of employment; training, promotion, transfer; health and safety; service and welfare; and joint relations.	Mr. Wood.
Econ. 335. Time Study.	0-3-0
Prerequisites: Econ. 201, 202, 203.	
Analysis of shop operation into elements, and the determination of the time for each element; emphasis on factors affecting job specification, and wage-rate setting.	Mr. Wood.
Econ. 340. Transportation Problems.	0-0-3
Prerequisites: Econ. 201, 202, 203.	
The economic aspects of transportation facilities provided by the railroads, highways, and air- and water-transportation agencies; principles and problems of rate making, operation, management, valuation, coördination and government regulation.	Mr. ....
Econ. 401. Advanced Accounting.	3-0-0
Prerequisites: Econ. 301, 302, 303.	
Problems of asset valuation, such as depreciation, replacements, amortization, etc., found in all types of business organizations.	Mr. Shulenberger.
Econ. 404, 405. Principles of Cost Accounting.	0-3-3
Prerequisites: Econ. 301, 302, 303.	
Cost finding, material costs, labor costs, overhead costs, etc.	Mr. Shulenberger.
Econ. 408. Survey of Statistical Methods.	3-0-0 or 0-3-0
Prerequisites: Econ. 201, 202, 203 or 205.	
Required of juniors in Forestry and Agricultural Economics, and of seniors in Rural Sociology.	
Elective for all others.	
Methods of describing quantitative data; collection and methods of analysis of statistical materials; charts and graphs for presenting numerical facts.	Mr. Leager.

Econ. 409. Statistical Technique.	0-3-0
Prerequisite: Econ. 408.	
Required of juniors in Agricultural Economics.	
The problem of estimation, correlation; simple linear and nonlinear forms; normal curve and probable error; methods of sampling.	
Mr. Leager.	
Econ. 414. International Economic Relations.	0-0-3
Prerequisites: Econ. 201, 202, 203 or 205.	
Backgrounds and some newer developments in international economics, with special emphasis on the position of the United States in world trade.	
Mr. Green.	
Econ. 415. Investment Problems and Policies.	0-3-0
Prerequisites: Econ. 201, 202, 203 or 205.	
Different types of investments and methods of judging them. Managing personal finances.	
Mr. Moen.	
Econ. 416. Public Finance and Taxation.	0-3-0
Prerequisites: Econ. 201, 202, 203.	
Classes of income and expenditure; incidence of different classes of taxes.	
Mr. Moen.	
Econ. 418. Principles of Insurance.	0-0-3
Prerequisites: Econ. 201, 202, 203.	
Elective.	
Risk as an element of all agricultural and industrial activity; discussion of such risks as can be covered by insurance with the appropriate form of insurance, e.g., employer's liability, workmen's compensation, fire, life, and other forms.	
Mr. Shulenberger.	
Econ. 501. Advanced Economic Theory.	3-3-0
Prerequisite: Eighteen (18) term credits in Economics.	
Recent and current economic theory; principal schools of economists; theory of prices under the system of free enterprise.	
Staff.	
Econ. 502. History of Economic Doctrines.	0-0-3
Prerequisite: Econ. 501.	
History of economic doctrines from the Mercantilists to the period of Ricardo.	
Staff.	

**EDUCATION: TEACHER EDUCATION****AGRICULTURAL EDUCATION****Ed. 308. Visual Aids.**

0-0-3

Prerequisite: Junior standing.

Required of students in Education.

Methods and technique of visual instruction; lettering; statistical illustrating; chart, graph, and poster-making; photography; projector operation, care, and use. Designed for teachers and extension workers.

Mr. Armstrong.

**Courses for Graduates and Advanced Undergraduates****Ed. 406. Principles of Teaching.**

3-0-0

Prerequisites: Ed. 303 or 304.

Required of seniors in Agr. Ed.

Principles of teaching with applications to vocational agriculture; personal requisites of a teacher; responsibilities; objectives of teaching; school control; motivation; directing study.

Mr. Cook.

**Ed. 407. Methods of Teaching Agriculture.**

5-0-0

Prerequisites: Ed. 303, 308, or equivalents, and at least 12 credits in Agriculture.

Required of students in Agricultural Education.

Organization of subject matter; teaching techniques; supervised practice; textbooks and reference material; Future Farmers of America; organization of departments of vocational agriculture; agricultural guidance.

Mr. Cook.

**Ed. 408. Observation and Directed Teaching.**

0-5-0

Prerequisites: Ed. 406, 407, and at least 12 credits in Agriculture.

Required of seniors in Agr. Ed.

Observation and teaching vocational agriculture under supervision; participation in the varied activities of the teacher of vocational agriculture.

Staff in Agricultural Education.

**Ed. 411. Evening Classes and Directed Teaching.**

0-5-0

Prerequisites: Ed. 406, 407, and at least 12 credits in Agriculture.

Required of seniors in Agr. Ed.

Community activities of teachers of vocational agriculture; organization, method, and directed teaching of evening and part-time classes. Mr. Cook.

Ed. 412. Materials and Methods in Teaching Agriculture.	0-5-0
Prerequisites: Ed. 406, 407, and 12 credits in Agriculture.	
Required of seniors in Agr. Ed.	
Use of illustrative and actual materials in teaching vocational agriculture; collection and preservation of specimens; chart making; practice in use of materials in directed teaching.	Mr. Armstrong.
Ed. 426. Secondary Education in Agriculture.	0-0-3
Prerequisites: Ed. 303 or 304, and 6 other credits in Education.	
Agricultural education in the United States; school organization; agricultural occupations.	Mr. Cook.
Ed. 460. Special Problems in Teaching Agriculture.	3 or 3 or 3
Prerequisites: Ed. 406, 407, or equivalent.	
Planning programs of work and courses of study; collecting and preparing materials for teaching; making teaching plans.	Mr. Cook and Staff.
Ed. 461 (a-b). Trends in Teaching Vocational Agriculture. 3 or 6 credits	
Prerequisites: 18 credits in Education, including 5 in Agricultural Education.	
Procedures in teaching vocational agriculture; out-of-school farm youth; evening-class instruction and the F. F. A.	
Staff in Agricultural Education.	
Ed. 462 (a-b). Course of Study Problems.	3 or 6 credits
Prerequisites: 18 credits in Education, including 5 in Agricultural Education.	
Selection and organization of subject matter in vocational agriculture; supervised practice.	Staff in Agricultural Education.
Ed. 463 (a-b). Guidance and Individual Instruction.	3 or 6 credits
Prerequisites: 18 credits in Education, including 5 in Agricultural Education.	
Individualized instruction applied to vocational agriculture; agricultural occupations, guidance, and counseling with special reference to pupils in vocational agriculture.	Staff in Agricultural Education.

### Courses for Graduates Only

**Ed. 516. Problems in Agricultural Teaching.** 3 or 3 or 3

Prerequisites: Ed. 407, and at least 12 other credits in Education and Agriculture. Experience in Agricultural Teaching will be accepted in lieu of Ed. 407.

Investigations, reports, and a critical evaluation of present practices; course adapted to individual interests and needs.

Staff in Agricultural Education.

**Ed. 517. Principles of Agricultural Education.** 3 or 3 or 3

Prerequisite: Eighteen credits in Education and Agriculture. Permission to register.

Principles and practices in agricultural education in the light of educational research and of changing rural conditions. Mr. Cook.

**Ed. 520. Agricultural Education Seminar.** 1-1-1

Prerequisite: Eighteen credits in Education.

A critical review of current articles and books of interest to students of agricultural education. Staff.

**Ed. 521. Research in Education.** 3-3-3

Prerequisite: Eighteen hours in Education and permission to register.

One or more research problems under the guidance of a member of the staff. Staff.

## INDUSTRIAL EDUCATION

AND

## INDUSTRIAL ARTS

**Ed. (I.A.) 105 a, b, c. Industrial Arts Drawing.** 3-3-3

Required of freshmen in Industrial Arts Education.

Fundamentals of pictorial representation, such as layout work, machine, and architectural drawing. Mr. Boshart.

**Ed. (I.A.) 106 a, b, c. Orientation in Industrial Arts.** 3-3-3

Required of freshmen in Industrial Arts Education.

Provides initial experiences for students interested in teaching Industrial Arts in the secondary school; emphasizes the importance and relation of Industrial Arts to other areas in the school and to individual development.

Mr. Ludington.

**Ed. (I.A.) 205. Industrial Arts Design.** 0-0-3

Prerequisite: Ed. (I. A.) 105, a, b, c.

Required of sophomores in Industrial Arts Education.

Design and construction in a variety of industrial materials; stressing individual expression and appreciation of well designed industrial products.

Mr. Boshart.

**Ed. (I.A.) 206a, b, c. Laboratory Problems in Industrial Arts.** 3-3-3

Prerequisites: Ed. (I. A.) 105 a, b, c, and I. A. 106 a, b, c.

Required of sophomores in Industrial Arts Education.

Explorations in drawing, planning, woodwork, metal work, and electricity.

Messrs. Ludington and Boshart.

**Ed. (I.A.) 306 a, b, c. Laboratory Problems in Industrial Arts.** 3-3-3

Prerequisites: Ed. (I. A.) 105 a, b, c; Ed. (I. A.) 106 a, b, c, and Ed. (I. A.) 206 a, b, c.

Required of all juniors in Industrial Arts Education.

Advanced hand and machine tool techniques in printing, electricity, and metal work; stressing the development of master craftsmanship and an understanding of related social-economic problems. Mr. Ludington.

**Ed. 344. Problems in Secondary Education.** 3-0-0

Prerequisites: Ed. 303, and 6 other credits in Education.

Required of juniors preparing to teach industrial subjects.

Problems of secondary education, with special reference to the relationships of industrial subjects with the other elements of the school program.

Mr. Boshart.

#### Courses for Graduates and Advanced Undergraduates

**Ed. 416. Local Survey; Planning a Program.** 0-3-0

Methods of surveying local occupations; use of the findings to plan a program of Industrial Education. Mr. Smith.

**Ed. 422. Methods of Teaching Industrial Subjects.** 3-0-0

Prerequisites: Ed. 304, 344.

Required of seniors in Industrial Arts Education and those preparing to teach vocational classes in trades and industries.

Principles of teaching in the classroom or shop; intended for those who are teaching or preparing to teach shop and drawing courses.

Mr. Boshart or Mr. Ludington.

**Ed. 427. Philosophy of Industrial Education.** 0-3-0

The philosophy of industrial education, a review of Federal and State legislation pertaining to industrial education; part-time, all-day trade, general industrial, and evening schools.

Mr. Smith.

**Ed. 433. Field Work in Secondary Education.** 0-3-0

Prerequisites: Ed. 344, and 6 credits in Education.

Required of juniors in Industrial Arts Education.

A study of pupil-teacher-community relationships at the secondary school level involving observations, visits, reports, readings, and conferences.

Staff.

**Ed. 440. Vocational Education.** 3 or 3 or 3

Prerequisites: Ed. 303, 344, and 6 additional credits in Education.

Elective for students in Industrial Arts and Industrial Education.

Problems of vocational education; underlying philosophy; its place in our system of education; the laws governing prevailing practices and administration; agricultural, homemaking, industrial, and commercial vocations; deals with all-day, evening, part-time, and general continuation class work.

Staff.

**Ed. 444. Observation and Directed Teaching of Industrial Subjects.**

3-3-0 or 0-3-3

Prerequisites: Ed. 422, 433.

Required of students who desire an "A" grade certificate to teach industrial subjects.

Observation of and active participation in phases of teacher activity; students will work in actual situations under supervision.

Staff.

**Ed. S., Ex. 452. Industrial Arts in the Elementary School.** 3 credits

Prerequisite: 12 credits in education and the consent of the instructor.

For advanced undergraduate and graduate students; organized to help students gain insights into the materials, processes, and products of industry fundamental to an understanding of major problems of living.

Staff.

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**Ed. (I.A.) 470 a, b, c. Laboratory Problems in Industrial Arts.** 3 or 3 or 3

An elective course for undergraduates and graduates with consent of the instructor.

Advanced laboratory conducted on general shop or laboratory of industries basis.

Mr. Ludington.

**Ed. S., Ex. 480. Modern Industries.**

3 credits

Prerequisite: 12 credits in education and consent of the instructor.

Elective course for advanced undergraduate and graduate students in industrial arts. Designed to assist teachers in guiding students to sources of information relative to various modern industries.

Staff.

**Ed. 482. Curriculum Problems in Industrial Arts.**

3-0-0

A course for advanced undergraduate and graduate students in Industrial Arts Education.

Planning and organizing of learning experiences in the Industrial Arts area.

Mr. Ludington.

**Ed. 483. Instructional Aids and Devices.**

0-3-0

Prerequisites: Ed. 304, and 6 other credits in Education.

Required of those intending to teach Industrial Arts or Industrial Education, and those who because of trade experience desire to teach trade subjects.

Analysis of learning units, and the preparation of instructional aids and devices.

Mr. Ludington.

**Ed. 484. Laboratory Planning and Equipment Selection.**

0-0-3

A course for advanced undergraduate and graduate students.

The physical planning of school shops and laboratories; selection of tools and equipment. Whenever possible, actual or contemplated school buildings will be used for class work.

Mr. Ludington.

**Ed. 492. Individual Problems in Education.**

3 credits

An elective course for graduate students in Industrial Arts Education and Industrial Education, with consent of instructor.

Individual and group studies of one or more major problems in Industrial Arts and Industrial Education. Problems will be approached through the application of research techniques with final reports prepared in a form suitable for publication as a magazine article, technical or professional bulletin.

Staff.

### Courses for Graduates Only

#### **Ed. 510. Administration and Supervision of Vocational Education.**

Prerequisites: Ed. 304, 344, 420, 440, or equivalent. 3 or 3 or 3

For graduate students majoring in Education.

Administrative and supervisory problems of vocational education; practices and policies of Federal and State offices; organization and administration of city and consolidated systems. Staff.

#### **Ed. 514. Modern Principles and Practices in Secondary Education.**

3 or 3 or 3

Required of graduate students in Guidance, Industrial Arts, and Industrial Education.

Foundations of modern programs of secondary education; purposes, curriculum, organization, administration, and the place and importance of the high school in the community in relation to contemporary social forces.

Mr. Ludington.

#### **Ed. 521. Research in Education.**

3 or 3 or 3

The student will make a study of one or more research problems under the supervision of some member of the staff of the Department of Teacher Education. The course will be selected on the recommendation of the member of the faculty with whom the student plans to carry on the study.

Staff.

#### **Ed. 530. Philosophy of Industrial Arts.**

3 or 3 or 3

Required of all graduate students in Industrial Arts Education; elective for others with consent of the instructor.

Current and historical developments in Industrial Arts; philosophical concepts, functions, scope, criteria for the selection and evaluation of learning experiences, laboratory organization, student personnel programs, community relationships, teacher qualifications, and problems confronting the Industrial Arts profession. Mr. Ludington.

### Occupational Information and Guidance

#### **Ed. 103. Occupations.**

3 or 3 or 3

Required in Occupational Information and Guidance. Elective for others.

A view of the field of occupations, supplying facts which young persons are entitled to have in deciding upon their life work. Mr. Boshart.

## Courses for Graduates and Advanced Undergraduates

**Ed. 420. Philosophy of Guidance.** 3 or 3 or 3

Prerequisite: 12 credits in education.

The place of guidance in the school program covering the elementary, junior high, and senior high divisions. It will treat of the development of educational and vocational guidance, the relation of personnel work, principles and practices of guidance in employment, and child legislation.

Mr. Boshart.

**Ed. 423. Methods of Teaching Occupations.** 3-0-0

Prerequisites: Ed. 304, 344.

Required of seniors expecting to teach occupational information and guidance and elective for others who are interested.

Principles of teaching occupational information and guidance; the selection and preparation of materials; the literature available, and methods of presentation.

Messrs. Boshart and Smith.

**Ed. 424. Occupational Studies.** 0-0-3

Prerequisite: 12 credits in Education.

Intended to acquaint teachers with the field of occupations; selection of suitable instructional materials and its presentation to pupils; analyses of leading groups of occupations.

Mr. Boshart.

**Ed. 433. Field Work in Secondary Education.** See page 224

**Ed. 481. Character Education.** 0-0-3

Prerequisite: 12 credits in Education.

Factors influencing character development; opportunities and responsibilities of the school for the conception and attitudes fundamental to good conduct, trends, materials, and procedures.

Mr. Cook.

**Ed. 490. Individual Problems in Guidance.** 3 or 3 or 3

Elective for advanced undergraduate and graduate students interested in the guidance field.

Intended for individual or group studies of one or more of the major problems in guidance and personnel work. Problems will be selected to meet the interests of individuals of the class and approached through research techniques with the idea of preparing suitable material for distribution in mimeographed or bulletin form.

Staff.

## Courses for Undergraduates

**Ed. 512. Problems in Counseling.** 0-0-3

Prerequisite: Ed. 420, 432, or equivalent.

Intended for teachers of experience and those interested in the problems of guidance in school and industry; attention to group and individual counseling as applied to the junior and senior high schools, colleges, or placement offices; procedures of conducting interviews and conferences.

Mr. Boshart.

**Ed. 521. Research in Education.** see page 226

## PSYCHOLOGY

**Ed. 303, 304. Educational Psychology.** 3-3-0

(For description of course see Psychology 303, 304)

Mr. Moffie.

**Ed. 476. Psychology of Adolescence.** 0-0-3

(For description of course see Psychology 476)

Mr. Moffie.

## ELECTRICAL ENGINEERING

## Courses for Undergraduates

**E. E. 201, 202, 203. Electrical Engineering Fundamentals.** 3-3-3

Prerequisite: Math. 102.

Required of sophomores in E. E. Concurrent with Phys. 201, 202, 203.

Fundamental laws of electric, magnetic and dielectric circuits; problem drill. Timbie and Bush: *Principles of Electrical Engineering*.

Messrs. Fouraker and Browne.

## Courses for Advanced Undergraduates

**E. E. 301, 302, 303. Electrical Engineering.** 4-4-4

Prerequisite: E. E. 202.

Required of juniors in E. E.

Principles, performances and characteristics of direct-current apparatus; theory of periodic currents, alternating-current circuits and systems. Kloeffler, Brennenman and Kerchner: *Direct Current Machinery*. Bryant and Correll: *A. C. Circuits*. Messrs. Fouraker and Pearsall.

E. E. 311, 312, 313. Electrical Engineering Laboratory, I.	2-2-2
Required of juniors in E. E. Concurrent with E. E. 301, 302, 303.	
A laboratory course coördinated with E. E. 301. Ricker and Tucker, <i>Electrical Engineering Laboratory Experiments.</i>	
Messrs. Lear, Pearsall, Keever, Glenn, and Nichols.	
E. E. 315, 316. Fundamentals of Electronics.	0-4-4
Prerequisite: E. E. 301.	
Required of Juniors in E. E.	
The fundamental principles of electron tubes and their associated circuits. Eastman: <i>Fundamentals of Vacuum Tubes.</i> Messrs. Glenn and Carley.	
E. E. 320, 321, 322. Elements of Electrical Engineering.	3-3-0 or 3-3-3
Prerequisites: Math. 202, Phys. 203.	
Required of juniors in Aero E., Chem. E., C. E., and Geol. E., and of seniors in Cer. E., Gen. E., I. E., and M. E.	
Theory and problems in applied electricity; motor characteristics and industrial applications.	
Messrs. Lear, Keever, Pearsall, Glenn, and Winkler.	
E. E. 325, 326, 327. Electrical Engineering Laboratory, II.	1-1-1
Required of Seniors in Gen. E., I. E., and M. E.	
A laboratory course coördinated and concurrent with E. E. 321, 322, 323.	
Messrs. Lear, Keever, Pearsall, Glenn, Winkler, Nichols.	
E. E. 343. Electrical Equipment of Buildings.	0-0-3
Prerequisite: Phys. 203.	
Required of seniors in C. E. in Construction and Building Materials Options and Architectural Engineering.	
Wiring of buildings for light and power; selection of motors and lighting equipment. Moyer and Wostrel: <i>Industrial Electricity and Wiring.</i>	
Messrs. Lear and Winkler.	
<b>Courses for Graduates and Advanced Undergraduates</b>	
E. E. 401, 402. Alternating-Current Machinery.	4-4-0
Prerequisite: E. E. 303.	
Required of seniors in E. E.	
Principles and characteristics of alternating current-machinery. Bryant and Johnson: <i>Alternating-Current Machinery.</i>	
Messrs. Fouraker and Keever.	

E. E. 403. Electric Transmission.	0-0-4
Prerequisite: E. E. 402.	
Theory and characteristics of electric circuits for transmission of power. Bryant and Correll: <i>Alternating Current Machinery</i> .	
Messrs. Fouraker and Keever.	
E. E. 411, 412, 413. Electrical Engineering Laboratory.	2-2-2
Required of seniors in E. E. Concurrent with E. E. 401, 402, 403.	
A laboratory course coöordinated with classroom work. Ricker and Tucker, <i>Electrical Engineering Laboratory Experiments</i> .	
Messrs. Keever, Pearsall, Glenn, and Winkler.	
E. E. 421, 422, 423. Electric Power Applications (Optional with E. E. 425, 426, 427).	3-3-3
Prerequisites: E. E. 303.	
Selection of electric equipment for industrial applications, control equipment; electric traction; electric power plants.	Mr. Browne.
E. E. 425, 426, 427. Electric Communications (Optional with E. E. 421, 422, 423). Concurrent with E. E. 445, 446, 447.	3-3-3
Prerequisites: E. E. 303.	
Circuits and equipment for wire communication; radio and carrier current systems. Everitt: <i>Communication Engineering</i> .	
Messrs. Fouraker and Glenn.	
E. E. 437. Illumination.	0-0-3
Prerequisites: E. E. 303.	
Required of seniors in E. E.	
Characteristics of electric lamps; electric lighting systems. Kunerth: <i>Textbook of Illumination</i> .	Mr. Lear.
E. E. 441, 442, 443. Electrical Measurements in Industry.	3-3-3
Prerequisite: E. E. 303 or E. E. 322 or E. E. 333.	
Theory and practice of electrical measurements in industry, including electrical methods applied to measurement of nonelectric values.	
Mr. Brown.	

E. E. 445, 446, 447. Ultra High Frequency Techniques.	4-4-4
Prerequisites: E. E. 401, 411, with E. E. 425, 426, 427 concurrently.	
The production, control and use of ultra high frequency radio signals for communication and detection. Brainerd, et al: <i>Ultra-High Frequency Techniques</i> .	Mr. Carley.
E. E. 453. Power Network Calculations.	0-0-3
Prerequisite: E. E. 403.	
The method of symmetrical components applied to fault calculation in power system networks.	Mr. ....
<b>Courses for Graduates Only</b>	
E. E. 501, 502, 503. Fundamental Principles in Electrical Engineering.	3-3-3
Prerequisites: E. E. 402, 403.	
Review of fundamentals involved in the more complex problems encountered in electrical engineering.	Mr. Fouraker.
E. E. 505, 506, 507. Electrical Engineering Seminar.	1-1-1
Prerequisite: Graduation in E. E.	
A series of papers and conferences of junior instructional staff and students who are candidates for advanced degrees in electrical engineering.	
	Messrs. Fouraker, Browne.
E. E. 521, 522, 523. Engineering Electronics.	4-4-4
Prerequisite: Graduation in E. E.	
Electron tubes in industry, including studies of various types of tubes and their associated circuits.	Mr. Carley.
E. E. 531, 532, 533. Illumination Engineering.	3-3-3
Prerequisite: Graduation in E. E.	
Advanced principles of Illumination Engineering.	Mr. Browne.
E. E. 550. Electrical Engineering Research.	3-3-3
Prerequisite: Graduation in E. E.	
Individual research in the field of Electrical Engineering.	Mr. Fouraker.

## ENGINEERING MECHANICS

### Courses for Advanced Undergraduates

**E. M. 311. Engineering Mechanics.** 3-0-0 or 0-3-0 or 0-0-3

Prerequisite: Math. 201.

Co-requisites: Math. 202 and Phys. 201.

Required of all students in Engineering.

Statics and Friction: Study of concurrent, parallel and nonconcurrent systems of both coplaner and noncoplaner forces; the application of statics to the solution of fundamental engineering problems, including statical friction. Seely and Ensign: *Analytical Mechanics for Engineers*.

Messrs. Smith, Conner, Mitchell, and Farlow.

**E. M. 312. Engineering Mechanics.** 3-0-0 or 0-3-0 or 0-0-3

Prerequisites: E. M. 311 and Math. 202.

Co-requisites: Math. 303.

Required of all students in Engineering.

Kinematics; centroids moments of inertia. Seely and Ensign: *Analytical Mechanics for Engineers*. Messrs. Smith, Conner, Mitchell, Farlow.

**E. M. 313. Engineering Mechanics.** 3-0-0 or 0-3-0 or 0-0-3

Prerequisites: E. M. 312 and Math. 303.

Required of all students in Engineering.

Kinetics: The motions of particles of rigid bodies as they are affected by the action of unbalanced forces. The Newtonian laws of motion; work and energy; power, impulse and momentum; applications to special engineering problems: Seely and Ensign: *Analytical Mechanics for Engineers*.

Messrs. Smith, Conner, Mitchell, and Farlow.

**E. M. 321. Strength of Materials.** 0-3-0 or 0-0-3

Prerequisites: E. M. 302 or E. M. 312, and Math. 303.

Co-requisite: E. M. 313.

Required of all students in Engineering.

Stresses and strains in engineering materials; tension, compression, shear, and torsion; emphasis on the applications to engineering structures; bending moments and shear in simple beams; fibre stresses in beams and their distribution throughout the cross section. Timoshenko and McCullough: *Elements of Strength of Materials*.

Messrs. Smith, Conner, Mitchell, and Farlow.

**E. M. 322. Strength of Materials.**

3-0-0 or 0-0-3

Prerequisite: E. M. 321.

Required of all students in Engineering except Chem. E., E. E., Geol. E., and Ind. E.

A continuation of E. M. 321. Various methods for finding the deflection of beams; determination of stresses in statically indeterminate beams; the study of columns; combined stresses. Timoshenko and McCullough: *Elements of Strength of Materials*.      Messrs. Smith, Conner, and Mitchell.

**E. M. 330. Fluid Mechanics.**

3-0-0, 0-3-0, or 0-0-3

Prerequisites: E. M. 302 or E. M. 313.

Required of students in Aero. E., Ch. E., C. E., E. E., Geol. E., M. E.

A study of the fundamental principles of mechanics of fluids; properties of fluids; intensity of pressure; hydrostatic pressure on areas; applications of hydrostatics; kinematics of fluid flow; dynamics of fluid flow; applications of hydrokinetics; friction losses in pipes; flow through pipes; dynamic forces. Daugherty: *Hydraulics*.      Messrs. Conner, and Mitchell.

**E. M. 331. Hydraulic Machinery.**

3-0-0 or 0-3-0

Prerequisite: E. M. 330.

Required of students in E. E. and M. E.

The application of the principles of fluid mechanics to hydraulic pumping and power machinery; impulse and reaction type turbines; turbine laws and factors; water power plants; pumping and machinery, reciprocating and centrifugal pumps; efficiency, capacity, and selection of pumps. Daugherty: *Hydraulics*, and *Notes*.      Messrs. Conner, and Mitchell.

**E. M. 332. Hydraulic Structures.**

0-3-0 or 0-0-3

Prerequisite: E. M. 330.

The application of the principles of fluid mechanics to various hydraulic structures and measuring devices; buoyant force and flotation; weirs, orifices, gates; forces exerted by fluids; flow in open channels; models of open channel flow, flow in pipe lines. Daugherty: *Hydraulics*, and *Notes*.

Messrs. Conner and Mitchell.

**Courses for Graduates and Advanced Undergraduates**

<b>E. M. 401. Advanced Strength of Materials.</b>	3-0-0
Prerequisites: E. M. 320 or E. M. 322.	
Elective for Engineering seniors and graduate students.	
Detailed study of the deflections of beams; special types of beams; statically indeterminate systems. Timoshenko: <i>Strength of Materials</i> .	Mr. Smith.

<b>E. M. 402. Advanced Fluid Mechanics.</b>	0-3-0
Prerequisite: E. M. 330.	
Elective for Engineering seniors and graduates.	
A study of more advanced problems than taken up in E. M. 330; kinematics of fluid flow; conformal mapping; laminar and turbulent flow; the boundary layer; flow around immersed bodies; closed conduits. Instructor's notes and selected references.	Mr. Conner.

<b>E. M. 404. Vibration Problems.</b>	0-0-3
*Prerequisites: E. M. 320 and 322, Math. 431a, or 431b.	
Elective for Engineering seniors and graduate students.	
Fundamental vibratory systems of one degree of freedom; balancing of rotating systems; calculation of critical speeds of rotating shafts; vibrating instruments; systems of several degrees of freedom. Den Hartog: <i>Mechanical Vibrations</i> .	Mr. Conner.

**Courses for Graduates Only**

<b>E. M. 501. Advanced Strength of Materials.</b>	3-0-0
Prerequisites: E. M. 401, Math. 431a or 431b.	
A study of more advanced problems than taken up in E. M. 320 or E. M. 322; energy of strain; Castigliano's Theorem; impact; Maxwell's Theorem; Mohr's circle. Timoshenko: <i>Strength of Materials</i> .	Mr. Smith.

<b>E. M. 502. Applied Elasticity.</b>	0-3-0
*Prerequisites: E. M. 401, Math. 431a or 431b.	
Stress analysis of machine parts; stress concentration; stress in curved bars; torsion and bending in prismatical bars; stress in thick-walled cylinders; fly wheels; shrink fits. Timoshenko: <i>Strength of Materials</i> .	Mr. Smith.

\* Math. 411, 412 are desirable.

E. M. 503. Applied Elasticity.	0-0-3
*Prerequisites: E. M. 502, Math. 431a or 431b.	
Thin bars, plates and slabs in compression, tension, or combined compression and tension; built-up columns. Timoshenko: <i>Strength of Materials</i> .	
	Mr. Smith.
E. M. 505. Research in Strength of Materials.	3-3-3
Special problems and investigations.	Mr. Smith.
*E. M. 506. Research in Mechanical Vibrations.	3-3-3
Prerequisite: E. M. 404.	
Special problems and investigations.	Mr. Conner.
*E. M. 507. Research in Fluid Mechanics.	3-3-3
Prerequisite: E. M. 402.	
Special problems and investigations.	Mr. Conner.

**ENGLISH****Freshman English**

Eng. 101, 102, 103. Composition.	3-3-3
Required of all freshmen.	
Grammar review and intensive practice in composition; reading and analysis of literary types, with emphasis upon both composition and appreciation; directed supplementary reading collateral with class study; exercises and reports; conferences.	
Messrs. Clark, Drake, Fountain, Ladu, Marshall, Nickell, Paget, Shelley, Wilson, Wynn.	

**Writing**

Eng. 211. Business English.	3 or 3 or 3
Prerequisite: Eng. 101, 102, 103.	
Practical application of the principles of composition; types of letters; form, style, and tone of effective correspondence; intensive word study; conferences.	Messrs. Wilson and Shelley.

**Eng. 215. Principles of News and Article Writing.** 3-0-0

Prerequisite: Eng. 101, 102, 103. (Class limited to twenty students.)

Introduction to the writing of simple news articles; class criticism of non-technical newspaper and magazine articles. Vocabulary building; collateral reading. Mr. Wynn.

**\*Eng. 216. Advanced Article Writing.** 0-3-0

Prerequisite: Eng. 101, 102, 103, and 215 or equivalent.

A continuation of Eng. 215, with intensive practice in writing and criticizing nontechnical articles. Subjects determined by student's interest. Vocabulary building; collateral reading. Mr. Wynn.

**Eng. 222. Advanced Composition.** 0-0-3

Prerequisite: Eng. 101, 102, 103.

An analysis of the techniques and aesthetics of prose style plus a study of exposition, the short-story, and other forms of creative writing. Original compositions; conferences. Mr. Shelley.

**Eng. 321. Technical Writing I. (For students in Engineering.)** 3 or 3 or 3

Prerequisites: Eng. 101, 102, 103, 211, 231, and one term of literature.

Intensive practice in writing engineering reports, articles, and papers for public delivery; readings in essays and in technical periodicals. Term papers in library research and technical-report writing. Mr. Fountain.

**Eng. 323. Technical Writing II. (For students in Agriculture and Forestry.)** 0-0-3

Prerequisites: Eng. 101, 102, 103, and required sophomore English courses.

Fundamentals of style in professional writing. Reports, articles, papers. Term papers in library research and in professional reports.

Mr. Fountain.

### Speech

**Eng. 231. Public Speaking.** 3 or 3 or 3

Prerequisites: Eng. 101, 102, 103.

Speech organization and effective delivery; extempore speeches; audience motivation and use of motivating process; acquisition of ease before audience. Messrs. Paget, Fountain.

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\* Not offered in 1945-46.

Eng. 236. Parliamentary Practice.	0-2-0
Prerequisites: Eng. 101, 102, 103.	
Not to be counted toward the fulfillment of any requirement in English.	
Rules and customs of assemblies, including organization, motions; participation in and conduct of meetings; parliamentary strategy.	
Mr. Paget.	
Eng. 237. Speech Adjustment.	0-0-2
Prerequisites: Eng. 101, 102, 103.	
Poise and pleasing communicative habits in all group contacts; habits of speech, posture, action, and language.	
Mr. Paget.	
Eng. 331. Persuasion.	3-0-0
Prerequisite: Eng. 231 or equivalent.	
Psychological forces, methods of conciliation, securing and holding attention, and winning response; extempore speeches and discussions.	
Mr. Paget.	
Eng. 332. Argumentation and Extemporaneous Speaking.	0-3-0
Prerequisite: Eng. 231 or equivalent.	
Analysis, brief-drawing and evidence, and methods of proof and refutation; fundamentals of conviction; naturalness and forcefulness; extempore speeches, debates, and discussions.	
Mr. Paget.	
Eng. 333. Public Address.	0-0-3
Prerequisite: Eng. 231 or equivalent.	
Public speaking for special occasions, including speech of introduction, committee-room speech, after-dinner speech, speech at professional convention, political speech, formal sales talk.	
Mr. Paget.	
Eng. 334. Radio Speaking.	0-0-2
Not to be counted toward the fulfillment of any requirement in English.	
Prerequisites: English 231, or equivalent; approved admittance by the instructor.	
A laboratory practice in the skills of radio speech; the physical properties of voice; diction; tempo; emotion.	
Mr. Wynne.	

**Literature**

<b>Eng. 261. English Literature I.</b>	<b>3-0-0</b>
Prerequisites: Eng. 101, 102, 103.	
Chief masterpieces of English literature from <i>Beowulf</i> through Shakespeare, with emphasis on social and historical backgrounds. Parallel readings and papers.	Mr. Clark.
<b>Eng. 262. English Literature II.</b>	<b>3 or 3 - 0</b>
Prerequisites: Eng. 101, 102, 103.	
Significant prose and poetry of the seventeenth and eighteenth centuries, with emphasis on the contribution of the two centuries to modern thought. Parallel readings and papers.	Messrs. Clark, Shelley.
<b>Eng. 263. English Literature III.</b>	<b>0 - 3 or 3</b>
Prerequisites: Eng. 101, 102, 103.	
Masterpieces of the nineteenth century, with emphasis on changing literary tastes and ideas; the impact of scientific development on thought and literature. Parallel readings and papers.	Messrs. Clark, Shelley.
<b>Eng. 265. American Literature I.</b>	<b>3-0-0</b>
Prerequisites: Eng. 101, 102, 103.	
A study of chief American literary productions in their historical setting, from the early colonial period to 1840.	Mr. Ladu.
<b>Eng. 266. American Literature II.</b>	<b>0-3-0</b>
Prerequisites: Eng. 101, 102, 103.	
A study of chief American literary productions in their historical setting, from 1840 to 1900.	Mr. Ladu.
<b>Eng. 267. American Literature III.</b>	<b>0-0-3</b>
Prerequisites: Eng. 101, 102, 103.	
A study of the leading American writers of the present century, with a relation of their works to the social background of the period.	Mr. Ladu.
<b>*Eng. 271. The English Novel.</b>	<b>3-0-0</b>
Prerequisites: Eng. 101, 102, 103.	
Analysis of representative novels of England and America, chosen to illustrate the development of the form and to provide a background for appreciating the modern novel.	Mr. Drake.

\* Not offered in 1945-46.

Eng. 272. Modern Drama	0-0-3
Prerequisites: Eng. 101, 102, 103.	
Modern plays, beginning with Ibsen; contemporary English and American productions.	Mr. Clark.
*Eng. 273. The Development of the Drama.	0-0-3
Prerequisites: Eng. 101, 102, 103.	
Origin, progress, and influence; plot, characterization, and interpretation of certain readings.	Staff.
Eng. 275. Southern Writers.	3-0-0
Prerequisites: Eng. 101, 102, 103.	
An introduction to Southern culture as revealed in poetry from Poe to John Crowe Ransom and in the regional novel and short story; readings in the contemporary Southern essay dealing with social, political, and literary problems.	Staff.
*Eng. 276. English Poetry, 1830-1900.	0-3-0
Prerequisites: Eng. 101, 102, 103.	
A study of major poets writing in an age of scientific progress and social change. Emphasis on Browning, Tennyson, and Arnold. Parallel readings and papers.	Staff.
*Eng. 281. Literary Masterpieces.	3-0-0
Prerequisites: Eng. 101, 102, 103.	
A background for the enjoyment of literature; an introduction to its appreciation and criteria.	Mr. Harrison.
Eng. 282. The Short-Story.	0-0-3
Prerequisites: Eng. 101, 102, 103.	
An appreciation of the present-day short-story through examination of development, structure, type, and style; a comprehensive term paper, or its equivalent in original short fiction.	Mr. Wynne.
Eng. 283. The Bible as Literature.	0-3-0
Prerequisites: Eng. 101, 102, 103.	
Selected books of the Old and New Testaments (King James Version) as literary and historical documents.	Staff.

\* Not offered in 1945-46.

Eng. 285. Shakespeare.	3-0-0
Prerequisites: Eng. 101, 102, 103.	
An analysis of principal plays. Reports on parallel readings.	
	Mr. Clark.
Eng. 286. The Romantic Period.	0-3-0
Prerequisites: Eng. 101, 102, 103.	
English literature from 1790 to 1830, with special emphasis on Wordsworth, Coleridge, Byron, Shelley, and Keats; collateral reading; reports.	
	Mr. Clark.
*Eng. 287. Modern Biography.	0-3-0
Prerequisites: Eng. 101, 102, 103.	
A study of short modern biographies by representative American and British writers; collateral reading in longer biographical works; reports and assignments for investigation.	
	Mr. Shelley.
*Eng. 291. The Eighteenth Century.	0-3-0
Prerequisites: Eng. 101, 102, 103.	
Chief masterpieces of English literature from Alexander Pope to nineteenth century; collateral reading; reports.	
	Staff.
Eng. 292. Contemporary British Literature.	0-0-3
Prerequisites: Eng. 101, 102, 103.	
An introduction to chief figures in contemporary British literature; Kipling, Galsworthy, Wells, Bennett, Conrad. Collateral readings; term paper.	
	Mr. Ladu.

## ETHICS AND RELIGION

### Courses

Rel. 301. Introduction to Religion.	3-0-0
Characteristics of the major religious sects of America and brief survey of recent trends in religious thought.	
	Mr. Hicks.
Rel. 302. The Life of Jesus.	3-0-0
The career of Jesus of Nazareth as recorded in the Synoptic Gospels and interpreted against the religious, economic, and political background of the age in which Jesus lived.	
	Mr. Hicks.

\* Not offered in 1945-46.

## Rel. 303. The Teachings of Jesus.

0-3-0

The ethical and religious teachings of Jesus as recorded in the Synoptic Gospels, with special emphasis on the contrast between the teachings of Jesus and his contemporaries.

Mr. Hicks.

## Rel. 304. Comparative Religion.

0-3-0

Brief history, general characteristics, and social significance of living religions of the world.

Mr. Hicks.

## Ethics 405. Social Ethics.

0-0-3

Prerequisite: Six term credits in Religion or related fields.

Review of the ethical codes of the larger professional groups, with analysis of the nature, evolution, and significance of moral values.

Mr. Hicks.

## Rel. 406. Problems of Religion.

0-0-3

Prerequisite: Six term credits in Religion or related fields.

Religious verities in an age of science and the problems of the church in modern times.

Mr. Hicks.

## Ethics 407. Ethical Problems of Adolescence.

3 credits

Prerequisite: Six term credits in Religion or related fields.

Typical adjustment problems of modern youth, with special consideration to adolescent and pre-adolescent sex instruction and guidance.

Mr. Hicks.

## Rel. 408. Christian Personality in Its Psychological Aspects.

3 credits

Prerequisite: Six term credits in Religion or related fields.

An analysis of the psychological validity of the principal ethical teachings of the Sermon on the Mount with emphasis on the relationship of religious attitudes and practices to mental and emotional stability and maturity.

Mr. Hicks.

## Ethics 409. Problems of Marital Adjustment.

3-0-0 or 0-3-0 or 0-0-3

Prerequisite: Six term credits in biological or social science. Sections limited to 25 students.

The practical application of pertinent findings of biological and social science to personal problems of premarriage and postmarriage adjustment. Lectures, discussions, and personal conferences.

Mr. Hicks.

## EXPERIMENTAL-STATISTICS

## Courses for Graduates and Advanced Undergraduates

Stat. 401, 402. Statistical Laboratory.	1-1-0
To accompany Stat. 412, 413 or Ec. 408, 409.	
Use of calculating machines and of punched-card tabulation equipment; short-cut machine methods; experience in handling large sets of data.	
	Mr. Anderson.
Stat. 411. Introduction to Experimental-Statistics.	3-0-0
Collection, tabulation, presentation, and interpretation of experimental data. A course designed for advanced students in applied sciences who have had no theoretical background in statistics.	
	Miss Fleming.
Stat. 412, 413. Experimental-Statistics.	0-3-3
Prerequisite: Sta. 411 or Ec. 409.	
The application of statistical techniques such as sampling, regression and analysis of variance and covariance to experimental data.	Mr. Rigney.
Stat. 421, 422, 423. Mathematical Statistics.	2-2-2
Prerequisite: Math. 303.	
Averages, moments, correlation, probability; the binomial, normal and Poisson laws; distribution of statistics, sampling of population, Sheppard's corrections and curve fitting.	Mr. Clarkson.
Stat. 431. Design of Experiments.	3 or 3 or 3
Prerequisite: Stat. 412.	
Fundamental principles of designs; randomized blocks, Latin squares, split-plot and factorial designs; individual comparisons, components of error and confounding. Application to problems in applied fields.	
	Miss Cox.
Stat. 441, 442, 443. Methods of Analysis of Economic Data.	3-3-3
Prerequisite: Math. 112.	
Review of algebra and trigonometry and the development of the fundamentals of calculus appropriate to problems in the fields of economics. Statistical analysis of economic data—distributions, averages, dispersion, correlation and regression, index numbers and tests of significance.	
	Mr. Anderson.

Stat. 451. Statistical Analysis of Social Data. 3-0-0 or 0-0-3  
 Prerequisite: Stat. 412.  
 Sampling social data, rural surveys and testing methods; analysis of variance and relationships; population studies. Application to problems in the fields of sociology, psychology and education. Mr. Hamilton.

#### Courses for Graduates Only

Stat. 511, 512, 513. Special Problems. 1 to 3-1 to 3-1 to 3  
 Development of techniques for specialized cases, particularly in connection with thesis problems. Staff.

Stat. 531. Design and Analysis of Samplings. 3-0-0  
 Prerequisite: Stat. 412.  
 Sampling from a homogeneous population; size of sample; structure of sampling investigations. Mr. Hendricks.

Stat. 532, 533. Crop Forecasting and Estimation. 0-3-3  
 Prerequisite: Stat. 531.  
 Methods used to select variables related to crop forecasting and estimating; selection techniques.

Stat. 542, 543. Experimental Designs. 0-3-3  
 Prerequisites: Stat. 413, 481.  
 Confounding, quasi-factorial designs, incomplete blocks and lattice squares. Pasture, field, greenhouse, animal, human and long-time experiments. Survey of type of designs available. Experimental results with appropriate methods of analysis and valid interpretations. Miss Cox.

Stat. 552, 553. Econometric Methods. 0-3-3  
 Prerequisites: Stat. 413, 441.  
 Mathematical formulation and exposition of demand, laws of production, monopoly and taxation; random element, seasonal and cyclical variations; trend, orthogonal polynomials and correlation of time series. Mr. Anderson.

Stat. 562. Psychometric Methods. 0-3-0  
 Prerequisites: Stat. 413, 451.  
 Rating scales; mental-test methods; item and factor analysis; standard partial regression coefficients and functional relationships.

**Stat. 571, 572, 573.** Advanced Mathematical Statistics. 3-3-3

Prerequisite: Stat. 423.

Theory of errors, maximum likelihood, estimation, least squares and distribution theory.

**Stat. 581, 582, 583.** Seminar. 1-1-1  
Staff.

**Stat. 591, 592, 593.** Research. 3-3-3  
Staff.

### FIELD CROPS (AGRONOMY)

#### Courses for Undergraduates

**F. C. 202.** General Field Crops. 0-3-0 or 0-0-3

Required of sophomores in Agriculture.

A standard introductory course, with emphasis given to the economic production of field crops as used in well-balanced cropping systems.

Mr. Stuart.

#### Courses for Advanced Undergraduates

**F. C. 302.** Cereal Crops. 0-3-0

Required of Field-Crops majors.

Advanced study of the various factors to be considered in the economic production of corn and small grains. Mr. Middleton.

**F. C. 312.** Tobacco Production. 0-3-0

Elective for juniors and seniors in Agriculture.

History, production, adaptation, type, and varieties of tobacco; its cultivation, harvesting, grading, and marketing. Laboratory consists of variety studies, and the grading of tobacco. Mr. Lutz.

**F. C. 323.** Cotton Production. 0-0-3

Elective for juniors and seniors in Agriculture.

History, production, adaptation, type, and varieties of cotton; its cultivation, harvesting, grading, and marketing. Laboratory consists of variety studies, and the classing of cotton lint. Mr. Stuart.

## Courses for Graduates and Advanced Undergraduates

F. C. 441. Seed Judging.	3-0-0
Elective for juniors and seniors in Agriculture.	
Advanced study of quality in crop seeds and the standards for seed certification; arranging and judging crop exhibits.	Mr. Stuart.
F. C. 443. Pastures and Forage Crops.	0-0-4
Prerequisite: F. C. 202.	
Required of Field Crop, Soil, and Animal Production majors.	
An advanced study of the production and preservation of the principal forage crops. Special attention is given to the production and maintenance of pastures.	Mr. Lovvorn.
F. C. 451. Market Grading of Field Crops.	3-0-0 or 0-3-0
Required of students in Animal Production.	
A study and application of the Federal Standards for Market grades as applied to field crops.	Mr. Stuart.
F. C. 461. Taxonomy of Field Crops.	3-0-0 or 0-0-3
Elective for juniors and seniors in Agriculture.	
Origin, botanical classification, identification, and adaptation of the commercially important crops and their varieties grown in America.	
Mr. Stuart.	
F. C. 463. Plant Breeding.	0-3-0
Prerequisite: Zool. 411.	
Required of students in Field Crops, Floriculture, Plant Pathology, Pomology and Vegetable Gardening.	
Lectures, field and laboratory exercises, including methods and principles of plant breeding.	Mr. Gregory.
F. C. 491, 492, 493. Special Problems.	3-3-3
Prerequisite: Admittance only with consent of instructor.	
Special problems in various phases of crop investigation. Problems selected or assigned; emphasis on review of recent and current research.	
Staff.	

## Courses for Graduates Only

F. C. 503. Research Methods in Agronomy. 0-0-3

Prerequisite: Stat. 412.

Planning and conducting research and interpretations of the data in agronomic fields. Mr. Rigney.

F. C. 523. Cytogenetics. 0-0-4

Prerequisite: Zoöl. 411, 412, and Bot. 451 or Zoöl. 441.

Given coöperatively by Agronomy and Botany Departments.

The principles and techniques of cytology as they are related to the genetics of economic plants; a survey of the major cytogenetic contributions to plant improvement and to theories of phylogeny. Mr. Smith.

F. C. 531, 532, 533. Seminar. 1-1-1

Prerequisite: Graduate standing in Field Crops.

Scientific articles, progress reports in research, and special problems of interest to agronomists will be assigned, reviewed, and discussed by students and members of the Agronomy Staff.

F. C. 541, 542, 545. Research.

Prerequisite: Graduate standing in Field Crops.

A study of special problems and methods of investigation. A student may select a problem in any phase of crop production or breeding. By arrangement.

Research in specialized phases of Field Crops.

## FORESTRY

## Courses for Undergraduates

For. 101, 102, 103. Elementary Forestry. 1-1-1

Required of freshmen in Forestry.

The nature and development of forests of the world, with special study of the forests of the United States; a correlation of all sciences required in forestry; field trips included. Mr. Hofmann.

<b>For. 111. Principles of Farm Forestry.</b>	3-0-0
Required of sophomores in Agriculture.	
Elective for junior and senior students not in Forestry.	
The theory and practice of forestry with special reference to the handling of farm woodlands and the utilization of their products; the place of forestry in farm management and the agricultural economy.	
	Mr. Kaufman.
<b>For. 202. Wood Technology.</b>	0-3-0
Required of sophomores in Forestry.	
Microscopic slides of the conifers and broad-leaved trees are studied in order to determine the occurrence, form, and structure of the wood elements. Identification by means of the hand lens is especially emphasized.	
	Mr. Slocum.
<b>For. s204. Silviculture.</b>	3 credits
Prerequisites: Bot. 211, 213.	
Sophomore summer camp.	
Growth and development of forest stands: establishment and measurement of sample plots.	Messrs. Miller, Slocum.
<b>For. s214. Dendrology.</b>	3 credits
Prerequisites: Bot. 211, 213.	
Sophomore summer camp.	
Identification and study of trees in Piedmont, Coastal, and Mountain sections of North Carolina.	Messrs. Slocum, Miller.
<b>For. 301. Timber Preservation.</b>	3-0-0
Prerequisite: For. 202.	
Elective for juniors and seniors in Forestry.	
Lumber and timber preservatives and their use; methods of preservation; relation of preservation to forestry and industry.	Mr. Slocum.
<b>Courses for Advanced Undergraduates</b>	
<b>For. s304. Mensuration.</b>	3 credits
Prerequisites: C. E. 221, 222.	
Sophomore summer camp.	
Collection of field data for stand and yield tables, stem analysis, and timber surveys.	Messrs. Slocum, Miller.

<b>For. 311. Silviculture I.</b>	3-0-0
Required of juniors in Forestry.	
Factors affecting tree growth and distribution; forest regions, sites, stands, and types; silvical requirements of important tree species.	
	Mr. Miller.
<b>For. 312. Silviculture II.</b>	0-3-0
Required of juniors in Forestry.	
Production, collection, extraction, storage, and planting of forest-tree seeds.	
	Mr. Slocum.
<b>For. 313. Nursery Practice.</b>	1 or 1 or 1
Preparation, seeding, watering, and weeding of seed beds in school nursery.	
	Mr. Slocum.
<b>For. 321. Forest Products.</b>	3-0-0
Prerequisite: For. 202.	
Required of seniors in Forestry.	
The source and method of obtaining derived and manufactured forest products other than lumber.	
	Mr. Wyman.
<b>For. 322. Naval Stores.</b>	0-3-0
Elective for juniors.	
Methods of turpentining woods practices; factors influencing oleoresin yields; distilling practices; integration with other forest products utilization.	
	Mr. Wyman.
<b>For. 323. Forest Utilization.</b>	0-0-2
Required of seniors in Forestry.	
The problems of more complete utilization of forest resources; utilization of present waste in commercial practice.	
	Mr. Wyman.
<b>For. 332. Forest Policy.</b>	0-3-0
Elective for juniors in Forestry.	
State and federal forest legislation; timber law, illustrated by court cases.	
	Mr. Miller.

**For. 333. Methods of Research in Forestry.** 0-0-3  
 Prerequisite: For. s204.  
 Elective for juniors in Forestry.  
 Methods of research used by the United States Forest Service, experiment stations, the Madison Laboratory, and State and private research organizations; sample plot technique. Mr. Miller.

**For. 342. Forest Protection and Improvements.** 0-3-0  
 Prerequisite: For. s204.  
 Required of juniors in Forestry.  
 Organization and operation of forest fire prevention and control methods. Forest road and telephone line construction and maintenance. Staff.

#### Courses for Graduates and Advanced Undergraduates

**For. 402, 403. Mensuration I, II.** 3-3-0  
 Prerequisite: For. s304.  
 Required of juniors in Forestry.  
 The measurement of timber, both standing and felled; log rules, form factors, stem analysis, and growth.  
 Methods of making volume, growth, and stand tables; increment and yield studies; development of stand and yield tables from field data. Mr. Slocum.

**For. 411. Silviculture III.** 3-0-0  
 Prerequisite: For. 312.  
 Required of seniors in Forestry.  
 Methods of cutting to secure natural regeneration; intermediate cuttings, and their effect on the stand; slash disposal. Mr. Miller.

**For. 412. Silviculture IV.** 0-3-0  
 Prerequisite: For. 411.  
 Required of seniors in Forestry.  
 The application of silvicultural methods in the forests of the United States. Mr. Miller.

<b>For. 421. Logging.</b>	3-0-0
Prerequisite: For. 311.	
Required of seniors in Forestry.	
The logging industry and transportation methods; logging costs; application of methods to specific conditions; all forest regions are covered, discussing the problems of each.	Mr. Wyman.
 <b>For. 422. Lumbering.</b>	 0-3-0
Elective for seniors.	
The manufacture and re-manufacture, transportation and handling of lumber; grades and grading of lumber.	Mr. Wyman.
 <b>For. 423. Lumber Seasoning.</b>	 0-0-2
Elective for seniors.	
Air-seasoning and kiln-drying of lumber; kiln construction and operation; defects and their control.	Mr. Wyman.
 <b>For. 431, 432. Forest Management.</b>	 3-3-0
Prerequisite: For. 311.	
Required of seniors in Forestry.	
Management of timber lands for economic returns; the normal forest taken as the ideal; the application of regulation methods to the forest; a typical working circle as developed by the United States Forest Service studied for each forest region.	Mr. Hofmann.
 <b>For. 433. Advanced Wood Technology.</b>	 0-0-3
Prerequisite: For. 202.	
Elective for juniors and seniors in Forestry.	
Advanced microscopic identification of the commercial woods of the United States; microscopic work in anatomy and identification.	Mr. Slocum.
 <b>For. 442. Forest Finance.</b>	 3-0-0
Required of juniors in Forestry.	
Forests as investments: interest, carrying charges, financial maturity; relation of intermediate to final and net incomes; forest taxation, hazards in forest investments, and forest insurance.	Staff.

For. 443. Timber Appraisal.	0-0-2
Required of seniors in Forestry.	
Field and office methods of valuing timber lands, with special reference to stumpage appraisal; the evaluation of damages to timber and forest property.	Mr. Wyman.
For. 452. Seminar.	0-2-0
Required of seniors in Forestry.	
A round-table discussion of forestry problems; trends of development in forestry and related sciences.	Staff.
For. 453. Senior Field Trip.	0-0-3
Required of seniors in Forestry.	
An extensive survey of logging, lumbering and utilization of forest production throughout the Southeast; a complete series of reports covering all plants and operations visited required.	Mr. Wyman.
For. 461, 462, 463. Forestry Problems.	3-3-3
Elective for seniors in Forestry.	
Assigned or selected problems in the field of silviculture, logging, lumber manufacturing, or forest management.	Staff.
<b>Courses for Graduates Only</b>	
For. 501, 502, 503. Advanced Forest Management Problems.	3-3-3
Complete management program for a specific forest area. Mr. Hofmann.	
For. 511, 512, 513. Advanced Silviculture Problems.	3-3-3
Advanced problems or experiments in silviculture.	Mr. Miller.
For. 521, 522, 523. Advanced Logging Problems.	3-3-3
Selected research logging problems of an advanced nature. Mr. Wyman.	

**For. 531, 532, 533. Advanced Lumber Manufacturing.** 3-3-3  
 Selected advanced problems dealing with the manufacture and seasoning  
 of lumber. Mr. Wyman.

**For. 541, 542, 543. Advanced Utilization Problems.** 3-3-3  
 Problems of an advanced grade in some phase of forest utilization.  
 Mr. Wyman.

**For. 551, 552, 553. Forest Valuation.** 3-3-3  
 Planning, organizing, and conducting, under general supervision, an im-  
 portant research project in one of the fields of valuation. Mr. Wyman.

**For. 561, 562, 563. Problems in Research.** 3-3-3  
 Specific forestry problems that will furnish material for a thesis.  
 Mr. Miller.

## GEOGRAPHY

### Courses for Undergraduates

**Geog. 201,2. Geography.** 3-3-0  
 Elective.  
 A course covering the principal elements of physical and human  
 geography. Mr. Shulenberger.

## GEOLOGY

### Courses for Undergraduates

**Geol. 101. Earth History.** 0-3-0  
 Elective. Not to be taken after Geol. 120, 220, and 222.  
 Introductory course in General Geology: changes in the earth, and under-  
 lying physical and life processes. Bradley: *The Earth and Its History*.  
 Mr. Stuckey.

**Geol. 120. Physical Geology.** 4 or 4 or 4  
 Required of freshmen in Basic Agriculture and Agricultural Education,  
 and of sophomores in Forestry and Landscape Architecture.

Dynamic processes acting on and within the earth; materials and make-up  
 of the earth's crust. Lectures, laboratories, and field trips. Longwell, Knopf,  
 and Flint: *Outlines of Physical Geology*, 2nd edition.  
 Messrs. Stuckey, Miller.

## Geol. 207. Ex. Physical Geography.

3-3-0

- A. The processes and forces involved in the development of land forms.  
 B. The physiographic provinces of the United States and their importance; physical geography of North Carolina.

Mr. Stuckey.

## Geol. 220. Engineering Geology.

3-0-0 or 0-0-3

Prerequisite: Chem. 101.

Required of sophomores in Agricultural, Ceramic, Civil, Geological, Highway, and Sanitary Engineering.

The principles of general geology and their application to engineering problems. Lectures, laboratories, and field trips. Ries and Watson: *Elements of Engineering Geology*, 2nd edition.

Messrs. Stuckey, Miller.

## Geol. 222. Historical Geology.

0-3-0

Prerequisite: Geol. 120 or 220.

Required of sophomores in Geological Engineering.

Major events in the history of North America; rise and development of main animal and plant groups. Lectures, laboratories and field trips. Schuchert: *Outlines of Historical Geology*.

Mr. Miller.

## Geol. 223. Geomorphology.

0-0-3

Prerequisite: Geol. 120 or 220.

Required of sophomores in Geological Engineering.

A systematic study of land forms and their relations to processes and stages of development and adjustment of topography to structure. Lectures, map interpretations, and field trips. Lobeck, *Geomorphology*.

Mr. Miller.

## Geol. 230. Mineralogy.

3-0-0 or 0-0-3

Prerequisite: Chem. 103.

Required of sophomores in Ceramic and Geological Engineering, and of seniors in Chemical Engineering.

Crystallography, and physical and chemical mineralogy. Lectures and laboratory work. Kraus, Hunt & Ramsdell, 3rd Edition: *Mineralogy*.

Messrs. Stuckey, Miller.

**Geol. 325. Geology and Mineral Resources of North Carolina.** 3-0-0

Prerequisite: Geol. 222.

Physical geography, general geology, common rocks and minerals, and mines and quarry products of the State. Lectures, laboratories, and field trips.

Mr. Stuckey.

**Geol. 332. Advanced Mineralogy.** 0-3-0

Prerequisite: Geol. 230. Required in Geological Engineering.

A continuation of Geol. 230. Special attention to chemical and blowpipe properties of a larger group of important minerals. Lectures and laboratory work.

Mr. Stuckey.

**Geol. 338. Thermal Mineralogy.** 0-3-0

Prerequisites: Geol. 230 and Chem. 331.

Required of juniors in Cer. E.

A study of the behavior of ceramic materials as controlled by variations in composition, temperature, and pressure.

Mr. Stuckey.

**Geol. 352. Structural Geology.** 0-4-0

Prerequisite: Geol. 120 or 220.

Required in Geological Engineering.

The arrangement and deformation of the different rock masses composing the earth's crust. Lectures, laboratories and field trips. Nevin: *Principles of Structural Geology*.

Mr. Miller.

**Geol. 353. Geophysics.** 0-0-4

Prerequisites: Geol. 352, Phys. 203, C. E. 226.

Required of juniors in Geological Engineering.

Discussion of the fundamental principles underlying all geophysical methods; procedure and instruments involved in gravitational, magnetic seismic and electrical methods; study of applications and interpretation of results.

Mr. Miller.

**Geol. 361. Stratigraphy and Index Fossils.** 3-0-0

Prerequisite: Geol. 222.

Required of juniors in Geological Engineering.

Distribution and conditions of origin of principal geologic formations in Southeastern United States; key fossils characteristic of each period.

Mr. Miller.

## Courses for Graduates and Advanced Undergraduates

Geol. 411, 412, 413. Economic Geology.	3-3-3
Prerequisites: Geol. 120 or 220; Geol. 230; Chemistry 103.	
Required of seniors in Geological Engineering.	
Mode of occurrence, association, origin, distribution, and uses of economically valuable minerals. Lectures, laboratories, and field trips. Ries: <i>Economic Geology</i> , 7th Edition.	Mr. Stuckey.
Geol. 431, 432, 433. Optical Mineralogy.	3-3-3
Prerequisites: Geol. 230, and Phys. 203.	
Required of seniors in Ceramic and Geological Engineering.	
Theory of light as applied to the polarizing microscope; practice in determining minerals in thin sections and by immersion methods. Lectures and laboratory work. Rogers and Kerr: <i>Optical Mineralogy</i> .	Mr. Stuckey.
Geol. 443. Petrology.	0-0-4
Prerequisites: Geol. 120 or 220; Geol. 230; and Chemistry 103.	
Required of juniors in Geological Engineering.	
Materials of the earth's crust; composition, texture, classification, identification, and alterations of the principal igneous, sedimentary, and metamorphic rocks. Lectures, laboratories, and field trip. Grout: <i>Kemp's Handbook of Rocks</i> .	Mr. Stuckey.
Geol. 462. Advanced Engineering Geology.	0-3-0
Prerequisite: Geol. 220.	
Required of seniors in Geological Engineering.	
The application of geologic principles to civil engineering practice; analysis of geologic factors and processes affecting specific engineering projects. Legget: <i>Geology and Engineering</i> .	Mr. Miller.
Geol. 463. Geological Surveying.	0-0-4
Prerequisites: Geol. 352 and 443.	
Required of seniors in Geological Engineering.	
Methods of field observation and the use of geologic surveying instruments; construction of a complete geologic map of a specific area. Lectures, laboratories, and field trips.	Mr. Miller.

**Geol. 471, 472, 473.** Mining Engineering, Mine Design, Ore Dressing. 3-3-3

Prerequisites: Geol. 230 and 352; C. E. 222 and 225.

Required of seniors in Geological Engineering.

Mining methods, both open pit and underground; mine examination and valuation; principles of ore dressing; problems in mine design. Young: *Elements of Mining.* Mr. Miller.

#### Courses for Graduates Only

**Geol. 511, 512.** Advanced Economic Geology. 3-3-0

Prerequisites: Geol. 411, 412, 413.

Detailed study of the origin and occurrence of specific mineral deposits.

Mr. Stuckey.

**Geol. 543.** Advanced Petrography. 0-0-3

Prerequisites: Geol. 433, 443.

Application of the petrographic microscope to the systematic and descriptive study of rocks. Mr. Stuckey.

**Geol. 591, 592, 593.** Geological Research. 3-3-3

Prerequisite: Permission of the Instructor.

Lectures, reading assignments, and reports; special work in Geology to meet the needs and interests of the students.

Mr. Stuckey.

#### HISTORY AND POLITICAL SCIENCE

##### Courses in History

**Hist. 101, 102, 103.** Economic History. 3-3-3

An examination of the important changes in European society and the forces which produced these changes during the periods of expansion and industrialization, as a background for a general treatment of the agricultural, industrial, and commercial development of the United States.

Messrs. Barnhardt, Bauerlein, Patton, Seegers.

Hist. 111, 112, 113. World History.	2-2-2
Required of freshmen or sophomores who do not take Military Science.	
A general survey of Western civilization from its beginning to the present day.	Mr. Barnhardt.
Hist. 211, 212, 213. History of the United States.	3-3-3
Elective for one, two, or three terms.	
A chronological treatment of the political, diplomatic, and constitutional history of the United States in the light of its economic and social significance.	Mr. Bauerlein.
Hist. Ex. 216. Medieval History.	3 credits
A survey of the political, social, economic, ecclesiastical, and cultural history of Europe from the fourth century to the close of the fifteenth century.	Mr. Barnhardt.
Hist. 221. History of Modern Europe.	3-0-0
Elective.	
A survey of the economic, political, and social developments in Europe from the age of the great discoveries to the close of the eighteenth century.	Mr. Barnhardt.
Hist. 222. History of Modern Europe.	0-3-0
Elective.	
A survey of European history during the nineteenth century, political, economic, and social movements being emphasized in proportion to their international or European importance.	Mr. Barnhardt.
Hist. 223. Contemporary Europe.	0-0-3
Elective.	
A survey of the contemporary history of the principal European states and their international relations in the twentieth century.	Mr. Barnhardt.
Hist. 306. North Carolina History.	0-3-0
Elective.	
A general survey of the political, social, economic, and cultural developments in North Carolina, with special emphasis on the nineteenth and twentieth centuries.	Mr. Barnhardt.

**Hist. Ex. 310, 311, 312.** Economic and Social History of the South. 9 credits  
 A study of the economic and social history of the Southern States.  
 Lectures, readings, and reports. Mr. Patton.

**Hist. Ex. 320.** American Biography. 3 credits  
 Representative men and women in American politics, law, religion, agriculture, industry, commerce, science, literature, and art. Mr. Barnhardt.

**Hist. 333.** History of American Agriculture. 0-0-3  
 Required of juniors in Rural Sociology; elective for others.  
 Main trends in agriculture in the United States, and the place of agriculture in the economic life of the nation; special emphasis on the period since the Civil War. Mr. Seegers.

**Hist. 340.** History of Modern England. 3 credits  
 Survey of English political, social, economic, and diplomatic history, with emphasis on the nineteenth and twentieth centuries. Mr. Barnhardt.

**Hist. Ex. 350.** Hispanic American History. 3 credits  
 A brief account of the colonial period and wars for independence, followed by more or less detailed study of the various Hispanic American republics, with emphasis upon their relations with the United States. Mr. Patton.

**Hist. Ex. 360.** Contemporary History of the United States. 3 credits  
 Significant developments in the United States since 1914, with particular emphasis on post-war problems, foreign affairs, and the New Deal. Mr. Patton.

#### Courses in Political Science

**Pol. Sc. 211.** American Government. 3 or 3 or 3  
 Meets School of Engineering Citizenship Requirement; required of juniors in Rural Sociology and Occupational Information and Guidance; elective for others.

A survey of the origins, structure, and functions of government in the United States, including foreign relations, constitutional decisions, and the New Deal. Mr. Patton.

Pol. Sc. 212. State Government and Administration.	0-3-0
Required of juniors in Rural Sociology and Occupational Information and Guidance; elective for others.	
A study of Federal-State relations, and the organization and administration of state and county governments. Special attention will be given to problems of government in North Carolina.	Mr. Patton.
Pol. Sc. 213. Municipal Government and Administration.	0-0-3
Required of juniors in Rural Sociology and Occupational Information and Guidance; elective for others.	
A study of the history, organization, and administration of American municipal corporations. Lectures, readings, and reports.	Mr. Patton.
Pol. Sc. 221. American Political Parties.	3-0-0
Elective.	
The origin and development of political parties in the United States: their functions, organization, regulation, campaign methods, and elections.	
	Mr. Patton.
Pol. Sc. 231. European Governments.	3-0-0 or 0-0-3
Elective.	
A study of the governments of England, France, Germany, Italy, and Russia.	
	Mr. Barnhardt.
<b>HORTICULTURE</b>	
Courses for Undergraduates	
Hort. 203. General Horticulture.	0-0-3
Required of sophomores in Agriculture.	
A course designed to give a general insight into the field of horticulture, including geographic centers of production, and the elements of the culture of fruit, vegetable, and flower crops.	Messrs. Gardner, Randall, Weaver.
Hort. 301. Plant Propagation and Nursery Practice.	3 or 3 or 3
Required of students majoring in Horticulture; elective for other juniors and seniors in Agriculture and Forestry.	
Study of methods and practice in seedage, cuttage, division, budding, and grafting; cultural principles and practices in growing nursery stock.	
	Messrs. Randall, Weaver.

Hort. 302. Vegetable Forcing.	0-3-0
Prerequisite: Hort. 203.	
Required of students majoring in vegetable growing; elective for other juniors and seniors in Agriculture.	
Production and management of vegetable crops under glass; practice in growing vegetables under protection.	Mr. Randall.
Hort. 303. Vegetable Gardening.	0-0-4
Prerequisite: Hort. 203.	
Required of students majoring in vegetable growing and fruit growing; elective for other juniors and seniors in Agriculture.	
Location, soil preparation, fertilization, irrigation, and general culture applicable to vegetable production.	Messrs. Randall, Weaver.
Hort. 311. Small Fruits and Grapes.	3-0-0
Prerequisite: Hort. 203.	
Required of students majoring in fruit growing and vegetable growing; elective for other juniors and seniors in Agriculture.	
A course in the culture and production of small fruits, including strawberries, dewberries, blackberries, blueberries, raspberries, and grapes.	
	Messrs. Gardner, Weaver.
Hort. 312. Floral Design.	0-1-0
Required of students majoring in floriculture; elective for other juniors and seniors in Agriculture.	
Principles and practices in the art of floral design; corsages, wreaths, sprays, baskets, and special arrangements.	Mr. Weaver.
Hort. 313. Home Floriculture.	0-0-3
Required of students majoring in vegetable growing; elective for other juniors and seniors in Agriculture.	
Principles and methods of growing garden flowers and house plants, including varieties and their adaptability.	
Hort. 321. Fruit and Vegetable Judging.	2-0-0
Prerequisite: Hort. 203.	
Elective for juniors and seniors in Agriculture.	
Practice in variety identification, and in judging plates, collections, boxes, and commercial exhibits of fruits and vegetables.	Messrs. Gardner, Randall.

Hort. 323. Ornamental Horticulture.	0-0-2
Prerequisites: Hort. 301 and L. A. 402.	
Elective for juniors and seniors in the School of Agriculture.	
The planting, transplanting, pruning, feeding, and protection of ornamental plants used in the construction and maintenance of rural home grounds. Lawn grasses and lawn-making.	Mr. Harris.
Hort. 331. Fruit Growing.	4-0-0
Prerequisite: Hort. 203.	
Required of students majoring in fruit growing, vegetable growing, poultry, and animal husbandry; elective for other juniors and seniors in Agriculture.	
A study of factors underlying fruit production; temperature and moisture relations; culture, fertilization, pruning, fruit setting, yield, and storage.	
	Messrs. Gardner, Schmidt, Weaver.
Hort. 341. Commercial Floriculture.	4-0-0
Prerequisites: Hort. 203, 301.	
Required of students majoring in floriculture; elective for other juniors and seniors in Agriculture.	
A study of the commercial production of the principal floral crops under protection and in the open, including actual planting and care of the crops.	
	Mr. Randall.
Hort. 351. Fruit and Vegetable Utilization.	3-0-0
Elective for juniors and seniors in Agriculture.	
Principles and methods involved in the commercial utilization of surplus and off-grade products; extraction and preservation of juices; quick-freezing methods; sweet-potato starch production; dehydration; other manufactured products and by-products.	
	Staff.

#### Courses for Graduates and Advanced Undergraduates

Hort. 401. Systematic Pomology (offered in alternate years).	2-0-0
Prerequisite: Hort. 331.	
Required of students majoring in pomology.	
Fruit varieties: their description, identification, nomenclature, and classification; their relationships and adaptations; judging methods and standards.	Mr. Gardner.

**Hort. 411. Systematic Olericulture (offered in alternate years).** 2-0-0

Prerequisite: Hort. 303.

Required of students majoring in vegetable growing.

Vegetable varieties: their description, identification, nomenclature, and classification; their relationships and adaptations. Mr. Randall.

**Hort. 412. Experimental Horticulture.** 0-3-0

Prerequisites: Hort. 331, 303, 341.

A systematic study of the sources of knowledge and results of experiments in fruit growing, vegetable growing, and floriculture.

Messrs. Gardner, Randall, Weaver.

**Hort. 421, 422, 423. Horticultural Problems.** 2-2-2

Prerequisite: twelve credit hours in Horticulture.

Required of all students majoring in Horticulture.

Systematic investigation of some phase of horticulture, each student choosing his own subject of study and pursuing it under direction of the instructor.

Messrs. Gardner, Randall, Weaver.

**Hort. 431, 432, 433. Senior Seminar.** 1-1-1

Prerequisite: twelve credit hours in Horticulture.

Required of all students majoring in Horticulture.

A discussion of problems of interest to horticulturists. Discussion topics are assigned to students and members of the Horticultural staff.

Staff.

#### Courses for Graduates Only

**Hort. 501, 502, 503. Methods of Horticultural Research.** 3-3-3

Prerequisite: eighteen credit hours in Horticulture.

A study of methods and procedure, outlining problems, assembling and analyzing data, and presenting results; critical review of experiment-station work.

Staff.

**Hort. 511, 512, 513. Seminar.** 1-1-1

Prerequisite: eighteen credit hours in Horticulture.

Required of graduate students only.

Assignment of scientific articles of interest to horticulturists for review and discussion; student papers and research problems for discussion.

Staff.

Hort. 521, 522, 523. Research.

3-5, 3-5, 3-5

Prerequisite: eighteen credit hours in Horticulture.

Graduate students will be required to select problems for original research in fruit growing, vegetable growing, or floriculture. The work and presentation of results should be of such merit as to be worthy of publication.

Staff.

**INDUSTRIAL ENGINEERING****Courses for Undergraduates**

I. E. 101, 102, 103. Industrial Organization.

3-3-3

Required of sophomores in I. E.

Engineering methods in studies of industrial enterprises.

I. E. 201, 202, 203. Management Engineering.

3-3-3

Prerequisite: I. E. 103.

Required of juniors in I. E.

Principles of management, administration, production, and sales; executive control, industrial relations, incentives, normal capacities, standard costs, and pricing; budgeting and planning. Gilman: *Analyzing Financial Statements*.**Courses for Advanced Undergraduates**

I. E. 301. Engineering Economics.

3 or 3 or 3

Prerequisite: Econ. 202 or 205.

Required of seniors in E. E., I. E., and in M. E., Furniture Option, elective for others.

Principles of investments, costs, and utility, with applications to engineering practice; choice of investments and replacements. Grant: *Principles of Engineering Economy, and Problems*.

I. E. 312, 313. Industrial Engineering Problems.

0-3-3

Prerequisites or concurrent: I. E. 201, 202, 203.

Required of seniors in I. E.

Detailed study of problems of moment in this rapidly developing field.

I. E. 322. Motion and Time Study.	0-3-0
Required of juniors in I. E., elective for others.	
Prerequisite: I. E. 201 or junior standing.	
Fundamentals of methods, involving motion and time, to reduce costs by finding "the one best way." Laboratory: Methods analysis, process and other charts, micromotion and timer techniques. Barnes: <i>Motion and Time Study</i> .	

#### Courses for Graduates and Advanced Undergraduates

I. E. 402. The Electrical Industry.	0-3-0
Prerequisite: I. E. 301.	
Required of seniors in E. E. and I. E.	
The operation, practices, management, and performance of electric light and power companies and other electrical industries. Factors, indexes, and comparisons; services and prices; cost analyses and predeterminations.	
I. E. 421, 422, 423. Public Utilities.	3-3-3
Prerequisite or concurrent: I. E. 301 or senior standing.	
Elective for seniors or graduate students.	
Public utilities and their regulation; services, rates, rate bases, returns, leading cases; current problems. Thompson and Smith: <i>Public Utility Economics</i> .	

I. E. 433. Investigation and Report.	0-0-3
Prerequisite: I. E. 312.	
Required of seniors in I. E.	
Investigation of a selected and approved problem.	

#### Courses for Graduates Only

I. E. 501, 502, 503. Industrial Engineering Research.	3-3-3
Prerequisite: Graduation in Engineering.	
Investigation of a problem of major importance in the field of Industrial Engineering.	

**Landscape Architecture****Courses for Undergraduates****L. A. 101, 102, 103. Arboriculture.**

1-1-1

Required of freshmen in Landscape Architecture; elective for other students in Agriculture.

Culture of plant materials: their planting, transplanting, training, fertilization, protection from pests; tree surgery, lawn making.

Messrs. Pillsbury, Weaver.

**Courses for Advanced Undergraduates****L. A. 201, 202, 203. Plant Materials: Woody Plants.**

2-2-2

Prerequisite: Bot. 203.

Required of sophomores in Landscape Architecture and juniors in Floriculture; elective for students in other curricula.

Trees, shrubs, and vines: their distribution, form and habits of growth, size, texture, color, and other characteristics determining use in planting design.

Mr. Randall.

**L. A. 212, 213. Theory of Landscape Design.**

0-3-3

Required of sophomores in Landscape Architecture; elective for students in other curricula.

Introduction to the study of landscape design; its theoretical basis; the meaning of taste; historic styles; elements, and landscape composition; planting design, and analyses of typical problems in landscape design.

Mr. Pillsbury.

**L. A. 303. Plant Materials: Herbaceous Plants.**

0-0-2

Required of juniors in Landscape Architecture; elective for students in other curricula. Prerequisite: Bot. 203.

Ornamental perennial and annual plants: height, habit of growth, texture, color, and other characteristics determining use in planting design.

Mr. Randall.

**L. A. 311, 312. History of Landscape Design.**

3-3-0

Prerequisites: L. A. 212, 213.

Required of juniors in Landscape Architecture.

History of the art of landscape design from antiquity to modern times; sketching from illustrations of design in important periods. Mr. Pillsbury.

L. A. 321, 322, 323. Landscape Design I.	4-4-4
Prerequisites: L. A. 311, 312.	
Required of juniors in Landscape Architecture.	
Problems in presentation, and in constructive design of small properties, gardens, and other special areas and suburban estates.	Mr. Pillsbury.
L. A. 402. Ornamental Plants.	0-2-0
Prerequisite: Bot. 203.	
Required of seniors in Vegetable Gardening and Pomology; elective for juniors or seniors in other curricula.	
Ornamental trees, shrubs, and vines: their characteristics used in the design of planting for home, school, church, and community-center grounds, and farmstead landscapes.	Mr. Randall.
L. A. 403. Landscape Gardening.	0-0-3
Prerequisites: L. A. 402, or 201, 202, 203.	
Required of seniors in Vegetable Gardening, Floriculture, and Pomology; elective for seniors in all other curricula.	
Landscape planning and planting design applied to the improvement of home, school, church, community-center grounds, and farmsteads; practice in methods of making measured surveys, mapping, and designing improvements and planting.	Mr. Pillsbury.
L. A. 411, 412, 413. Planting Design.	3-3-3
Prerequisites: L. A. 201, 202, 203, and 303.	
Required of seniors in Landscape Architecture.	
Problems in composition with plant materials, presentation details, the preparation of planting plans, and cost data.	Mr. Pillsbury.
L. A. 421, 422, 423. Landscape Design II.	4-4-4
Prerequisites: L. A. 321, 322, 323.	
Required of seniors in Landscape Architecture.	
Problems in presentation, and in the design of small parks and other public grounds, and institutional groups.	Mr. Pillsbury.
L. A. 432. City Planning.	0-3-0
Required of seniors in Landscape Architecture; elective for seniors in all schools.	
Origins and types of urban communities; modern city and town planning; legal, economic, social, and aesthetic phases and their interrelationships; fundamental data required; methods of planning and financing; zoning; city and regional planning legislation.	Mr. Pillsbury.

L. A. 442. Suburban Design.	0-4-0
Prerequisite: L. A. 321, 322, 323, and 432.	
The subdivision of land as related to suburban development and urban growth.	Mr. Pillsbury.
L. A. 451, 452, 453. Landscape Construction.	2-2-2
Required of seniors in Landscape Architecture. Prerequisite: C. E. 224, 225, 226, and 227; and L. A. 321, 322, 323.	
Problems in design of ground surface, walks, and drives; preparation of plans for grading and drainage; estimates of materials and costs, and methods of execution of landscape designs.	Mr. Pillsbury.
L. A. 463. Office Practice.	0-0-1
Prerequisite: L. A. 451, 452, 453.	
Arrangement of equipment, supplies, data, and illustrative and other material in landscape offices; methods of professional procedure, and professional ethics.	Mr. Pillsbury.

## MATHEMATICS

### Courses for Undergraduates

*Math. 101. Algebra for Engineers.	6-0-0
Required of freshmen in the School of Engineering, and in the Departments of Industrial Management, Industrial Arts, and Landscape Architecture.	
Quadratic equations, the progressions, the binomial theorem, permutations and combinations, logarithms, the general theory of equations, the solution of higher equations, determinants and partial fractions. Fisher: <i>College Algebra.</i>	Staff.
*Math. 102. Trigonometry for Engineers.	0-6-0
Prerequisite: Math. 101.	
Required of freshmen in the School of Engineering, and in the Departments of Industrial Management, Industrial Arts, and Landscape Architecture.	
The trigonometric functions, derivation of formulae, the solution of plane and spherical triangles, with practical applications, slide rule, complex numbers, and hyperbolic functions. Clarkson and Bullock: <i>Plane and Spherical Trigonometry.</i>	Staff.

\* This course will be repeated the following term.

**\*Math. 103. Analytical Geometry.**

0-0-6

Prerequisites: Math. 101, 102.

Required of freshmen in the School of Engineering, and in the Departments of Industrial Management, Industrial Arts, and Landscape Architecture.

Loci of equations, the straight line, circle, parabola, ellipse, hyperbola, the general equation of the second degree, polar coördinates, transcendental curves, parametric equations, coördinates in space, planes and surfaces. Smith, Gale and Neelley: *Elements of Analytical Geometry.* Staff.

**\*Math. 111. Algebra.**

4-0-0

Review of elementary topics, such as Factoring, Fractions, Simple Equations, Exponents, and Radicals. Topics then taken up are Quadratic Equations, Solution of Higher-Degree Equations, Simultaneous Quadratic Equations, Logarithms, the Binomial Theorem, Arithmetic and Geometric Progressions, Permutations, Combination, and the Elementary Theory of Probability. Fisher: *College Algebra.* Staff.

**\*Math. 112. Trigonometry.**

0-4-0

Prerequisite: Math. 111.

The study of the Trigonometric Functions with their applications to the solution of the right and oblique triangles, with numerous problems. Also a brief study of Trigonometric Equations, and Identities and Inverse Functions. Practical Mensurations of Solids is taken up. Clarkson and Bullock: *Trigonometry.* Staff.

**\*Math. 113. Mathematics of Finance.**

0-0-4

Prerequisite: Math. 112.

Simple and compound interest, annuities, sinking funds and amortization, and the valuation of bonds and other applications. Smail: *Mathematics of Finance.* Staff.

**\*Math. 201. Calculus I.**

4-0-0

Prerequisite: Math. 103.

Required of sophomores in Engineering.

A course in the fundamental principles of the calculus, including the formulas for differentiation, and for integration of polynomial functions, with applications to geometry and to problems in rates, maxima and minima, curve tracing, curvature, areas, volumes, work, pressure, velocity and acceleration. Smith, Salkover, Justice: *Calculus.* Staff.

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\* This course will be repeated the following term.

\*Math. 202. Calculus II. 0-4-0

Prerequisite: Math. 201.

Required of sophomores in Engineering.

A continuation of Calculus I. Methods of integration, and the study of the definite integral, with applications to problems in areas, volumes, lengths of arcs, surfaces, centroids, moments of inertia, radii of gyration, approximate integration. Smith, Salkover, Justice: *Calculus*. Staff.

\*Math. 303. Calculus III. 0-0-4

Prerequisite: Math. 202.

Required of sophomores in Engineering.

A continuation of Calculus II. Indeterminate forms, infinite series, expansion of functions, hyperbolic functions, partial differentiation, double and triple integrals, and differential equations. Smith, Salkover, Justice: *Calculus*. Staff.

#### Courses for Graduates and Advanced Undergraduates

Math. 431-a. Differential Equations. 3-0-0

Prerequisite: Math. 303.

Required of juniors in Electrical Engineering and elective for others.

Solution of standard types of equations; numerous examples in the field of Electrical Engineering. Kells: *Differential Equations*. Mr. Bullock.

Math. 431-b. Differential Equations. 3-0-0

Prerequisite: Math. 303.

Elective. Principally for students in Chemical Engineering.

A study of the equations that occur in Applied Chemistry. Much emphasis on graphic methods and numerical work. Phillips: *Differential Equations*. Mr. Winton.

Math. 432. Advanced Differential Equations for Electrical Engineers. 0-3-0

Prerequisite: Math. 431-a.

Elective.

A continuation of the work given in Math. 431-a. Series solutions, approximate methods, partial differential equations, hyperbolic functions, and other topics will be studied with special emphasis on applications to problems in Electrical Engineering. Students not taking Electrical Engineering may register for the course and will be assigned individual problems in their particular field. Lecture notes. Mr. Bullock.

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\* This course will be repeated the following term.

**Math. 402. Graphical and Numerical Methods.**

0-3-0

Prerequisite: Math. 303.

Elective.

Graphical and numerical approximate methods in differentiation, integration and the solution of both ordinary and differential equations. Theory of least squares and empirical curve fitting. Numerous examples in the fields of physics, electricity, mechanics, and engineering will be solved.  
 Mackey: *Graphical Solutions*.  
 Mr. Cell.

**Math. 403. Vector Analysis I.**

0-0-3

Prerequisite: Math. 431 (a or b).

Elective.

Different vector products; the calculus of vectors with applications to geometry and mechanics. Phillips: *Vector Analysis*.  
 Mr. Clarkson.

**\*\*Math. 411. Advanced Calculus for Engineers.**

3-0-0

Prerequisite: Math. 431 (a or b).

Elective.

Hyperbolic functions, elliptic integrals and functions, partial differentiation of composite functions, differentiation of integrals, implicit functions. Applications to problems in engineering will be emphasized. Reddick and Miller: *Advanced Mathematics for Engineers*.  
 Mr. Mumford.

**\*\*Math. 412. Advanced Calculus for Engineers.**

0-3-0

Prerequisite: Math. 431 (a or b).

Elective.

Power series, Gamma and Bessel functions, functions of a complex variable, line integrals. Applications to problems in engineering will be emphasized. Reddick and Miller: *Advanced Mathematics for Engineers*.  
 Mr. Mumford.

**\*\*Math. 413. Series for Engineers.**

0-0-3

Prerequisite: Math. 431 (a or b).

Elective.

Fourier series, partial differential equations, with applications to problems in physics and engineering. Reddick and Miller: *Advanced Mathematics for Engineers*.  
 Mr. Mumford.

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\*\* Math. 411, 412, 413, may be taken in any order.

**Math. 421. Advanced Analytic Geometry.**

3-0-0

Prerequisite: Math. 303.

Elective.

The elements of higher plane curves and the geometry of space. Snyder and Sisam: *Analytic Geometry*.

Mr. Bullock.

**Math. 422. Theory of Equations.**

0-3-0

Prerequisite: Math. 303.

Elective.

The usual topics in the theory of equations, the solution of higher equations, exponential equations, logarithmic equations, and determinants. Dickson: *First Course in Theory of Equations*.

Mr. Mumford.

**Courses for Graduates Only****Math. 501. Applied Mathematics I.**

3-0-0

Elective for graduate students only. Prerequisite: Math. 413 or the consent of the instructor.

The course will be arranged to fit the engineering interests of the students enrolled.

Catenary cables, straight-and-curved-beam problems, theory of curve fitting, probability and applications, problems in the theory of elasticity, ballistics, vibration theory and problems, electrical circuits, Heaviside operational calculus and applications to electrical engineering and to other engineering problems, calculus of finite differences and applications. Lecture notes.

Mr. Cell.

**Math. 502. Applied Mathematics II.**

0-3-0

Prerequisite: Math. 501.

Elective. For graduate students only.

A continuation of Math. 501. Lecture notes.

Mr. Cell.

**Math. 503. Applied Mathematics III.**

0-0-3

Prerequisite: Math. 502.

Elective. For graduate students only.

A continuation of Math. 502. Lecture notes.

Mr. Cell.

## MECHANICAL ENGINEERING

## Courses for Undergraduates

**M. E. 101, 102, 103.** Engineering Drawing I. 2-2-2

Required of freshmen in Textiles.

Drawing-board work on lettering, projections, sections, pictorial drawings, with working drawings related to textile machinery; tracing and blueprinting. French and Svensen: *Mechanical Drawing*. Leonard: *Lettering Exercises for Engineers and Draftsmen*.

Messrs. Briggs, Brown, Adams, Hyde, Leonard, Stinson.

**M. E. 105, 106.** Engineering Drawing II. 3-3-0

Required of freshmen in Engineering, Agricultural Engineering, and Landscape Architecture.

Drawing-board work on lettering, projections, sections, revolution, auxiliary views, pictorial drawings, intersection, development, working drawings; tracing and blueprinting. French: *Engineering Drawing*. Leonard: *Lettering Exercises for Engineers and Draftsmen*.

Messrs. Briggs, Brown, Adams, Hyde, Leonard, Stinson.

**M. E. 107.** Descriptive Geometry. 0-0-3

Prerequisite: M. E. 105, 106.

Required of freshmen in Engineering, Agricultural Engineering, and Landscape Architecture.

Representation of geometrical magnitudes with points, lines, planes, and solids; the solutions of problems. Warner: *Applied Descriptive Geometry*.

Messrs. Briggs, Brown, Adams, Hyde, Leonard, Stinson.

**M. E. 121.** Woodwork. 1 or 1 or 1

Required of sophomores in A. E., and freshmen in Textiles.

Use of bench tools, making cabinet joints, operation and care of wood-working machinery; correct methods of staining, varnishing, filling, and gluing various kinds of wood. Mr. Rowland.

**M. E. 122.** Foundry. 1 or 1 or 1

Required of sophomores in A. E. and Ch. E., and freshmen in Textiles.

Demonstration and practice in molding and core making; cupola practice. Stimpson, Grey and Grennan: *Foundry Work*. Mr. Maddison.

M. E. 123. Forge Work.	1 or 1 or 1
Required of sophomores in A. E. and Ch. E., and freshmen in Textiles.	
Hand forging of simple exercises, in mild steel, representative of industrial practice; the origin, purification and fabrication of ferrous metals; the identification and uses of these metals. Coleman: <i>Forge Note Book</i> .	
	Mr. Cope.
M. E. 124. Pattern Making.	2 or 2 or 2
Required of sophomores in M. E. and I. E.	
Elementary joinery, finishing, theory of dry-kilning, wood-turning; lectures, demonstrations, and practice in hand work and machine methods; typical patterns and core boxes constructed, such as solid, split, and loose piece. Turner and Town: <i>Pattern Making</i> .	
	Mr. Rowland.
M. E. 125. Foundry Practice.	2 or 2 or 2
Required of sophomores in I. E., and M. E.	
Lectures, demonstrations, and practice in molding and core making, cupola operations; melting and casting of ferrous and nonferrous metals and their alloys; instructions and practice in the testing of molding sands. Wendt: <i>Foundry Work</i> .	
	Mr. Maddison.
M. E. 126. Forging and Welding.	2 or 2 or 2
Required of sophomores in I. E., and M. E.	
A study of the principles and practices of forging: hand forging as correlated with the industrial processes of hammering, rolling, and pressing. Lectures, demonstrations, and practice in forge, oxy-acetylene, and electric welding. Johnson: <i>Forging Practice</i> .	
	Mr. Cope.
M. E. 128. Forge and Welding Practice.	3 or 0 or 3
Required of sophomores in E. E.	
Hand forging of exercises in mild and tool steel correlated with the industrial methods of hammering, rolling and pressing; principles and modern practices; identification of ferrous metals; practice in forge, oxy-acetylene and electric welding. Campbell: <i>The Working, Heat Treating and Welding of Steel</i> .	
	Mr. Cope.

**M. E. 211, 212, 213. Mechanical Drawing.**

2-2-2

Prerequisites: M. E. 105, 106, 107.

Required of sophomores in M. E., A. E., and juniors in Ind. Ed.

Drawing-board work on machine fastenings, pipe fittings, cam design; technical sketching, applied descriptive geometry, and working drawings; tracing and blueprinting. French: *Engineering Drawing*.

Mr. Brown.

**M. E. 215, 216, 217. Elementary Mechanism.**

1-1-1

Prerequisites: M. E. 105, 106, 107.

Required of juniors in E. E. and A. E.

The study of linkages, cams, gears, belting, gear trains, and other simple mechanisms; design and drawings of simple machine parts. Keown and Faires: *Mechanism*.

Messrs. Briggs, Adams, and Brown.

**M. E. 224. Factory Equipment.**

0-0-3

Prerequisites: M. E. 124, 125, 126.

Required of juniors in I. E.

To summarize and coördinate all previous shop courses and show their relation to manufacturing processes; the essential principles of machine-tool operation; machine-tool selection and application for economic production. Roe and Lytle: *Factory Equipment*.

Mr. Wheeler.

**M. E. 225, 226. Machine Shop I.**

1-1-0

Prerequisites: M. E. 121, 122, 123.

Required of juniors in Chem. Eng.

Practice in chipping, filing, scraping, and babbetting: general machine work, including straight and taper turning, drilling, shaper work, and gear cutting.

Mr. Wheeler.

**M. E. 227, 228, 229. Machine Shop II.**

1-1-1

Prerequisites: M. E. 121, 122, 123, or M. E. 124, 125, 126.

Required of juniors in I. E. and M. E., and Yarn manufacturing.

Practice in laying out work, grinding tools, chipping, drilling, tapping, babbetting bearings, and scraping; machine work, including centering, straight and taper turning, chucking, screw cutting, shaper work, planer work, index milling and gear cutting. Turner: *Machine Tool Work*.

Mr. Wheeler.

## M. E. 235, 236. Metal Shop.

3-3-0

Prerequisite: Ed. 106.

Required in Industrial Arts.

Use of hand and machine tools in problems for secondary schools. Kaup: *Machine Shop Practice*. Mr. Wheeler.

## M. E. 241, 242, 243. Oxy-Acetylene and Electric Welding.

1-1-1

Prerequisite: M. E. 123 or equivalent.

Elective.

Fundamental methods and principles of fusion welding: welding symbols, economic and metallurgical considerations, selection of method and type of welding. *Welding Handbook* of the American Welding Society.

Mr. Cope.

## M. E. 307, 308, 309. Engineering Thermodynamics I.

3-3-3

Prerequisites: Phys. 201, 202, 203, Math. 303.

Required of juniors in E. E., M. E., I. E., A. E., C. E., Cer. E., and Geol. Eng.

The study of heat as an engineering medium; combustion, heat transfer, and the laws governing energy transformations; use of the general energy equation dealing with gases, vapors, and mixtures; application of fundamental principles to design and performance of nozzles, steam engines and turbines, internal-combustion engines, refrigerating machines, and air compressors. Faires: *Applied Thermodynamics*. Messrs. Hoefer and Rice.

## M. E. 313, 314, 315. Mechanical Engineering Laboratory I.

1-1-1

Concurrent with M. E. 307, 308, 309.

Required of juniors in E. E., I. E., Cer. E., and M. E.

Calibrating pressure, temperature, speed, and power-measuring instruments; the testing of fuels, lubricants, pumps, compressors, steam engines and turbines, heating and ventilating equipment, hydraulic machinery, and internal-combustion engines. Rice: *Experimental Engineering*.

Messrs. Bridges, Van Note, and Loewensberg.

## M. E. 317, 318, 319. Kinematics.

3-3-3

Prerequisites: M. E. 211, 212, 213.

Required of juniors in M. E.

A study of the science of the motion of machine parts, with emphasis on belts, pulleys, cams, gears, chain drives, shafts, and links. Sloane: *Engineering Kinematics*. Mr. Brown.

**M. E. 322, 323. Metallurgy.** 0-3-3

Prerequisites: Chem. 101, 102, 103.

Required of juniors in M. E. and A. E.

The constitution, structure and properties of engineering ferrous and non-ferrous metals and alloys; influences of mechanical working and heat treatment; physical testing; corrosion and its prevention. Sisco: *Modern Metallurgy for Engineers*.  
Mr. Van Note.

**M. E. 341, 342, 343. Furniture Design.** 3-3-3

Prerequisites: M. E. 124, 125, 126 and M. E. 211, 212, 213.

Required of juniors in Mechanical Engineering II.

Principles of elementary freehand design; methods of dry-kilning, finishing, filling and staining. Dean: *Modern American Period Furniture*.

Mr. Rowland.

**M. E. 350. Advanced Engineering Drawing.** 0-3 or 3

Prerequisites: M. E. 105, 106, 107 and E. M. 302 or 313 or M. E. 101, 102, 103 and one of the following: Tex. 304, 310, 339, 381.

Elective: For advanced undergraduates.

Drawing-board work as related to special problems in the various engineering and textile fields. The course will also include lectures, recitations, and individual conferences.

Mimeographed problem sheets and handbooks will be used.

Messrs. Briggs and Brown.

#### Courses for Graduates and Advanced Undergraduates

**M. E. 401, 402, 403. Power Plants.** 3-3-3

Prerequisites: M. E. 307, 308, 309 and M. E. 313, 314, 315.

Required of seniors in Mechanical Engineering I.

Fuels and combustion; heat balance, steam boilers, prime movers, and auxiliaries, as applied to power generation. Morse: *Power Plant Engineering and Design*.  
Mr. Vaughan.

**M. E. 404. Heating and Air-Conditioning I.** 0-3-0

Prerequisites: M. E. 307, 308, 309.

Required of seniors in Mechanical Engineering I.

Principles of heating and ventilation; warm air, steam, and hot-water heating systems; air-conditioning. Severns: *Heating, Ventilating, and Air-Conditioning Fundamentals*.  
Messrs. Hoefer and Rice.

**M. E. 405. Refrigeration.**

0-0-3.

Prerequisites: M. E. 307, 308, 309.

Required of seniors in Mechanical Engineering I.

Theory of refrigeration; types of ice-making and refrigerating machinery; cooling for air conditioning; installation, management, and cost of operation. Sparks: *Mechanical Refrigeration*. Messrs. Rice and Hoefer.**M. E. 407, 408, 409. Mechanical Engineering Laboratory II.**

1-1-1

Prerequisites: M. E. 313, 314, 315.

Required of seniors in Mechanical Engineering I.

Advanced study and tests in the fields of power plants, air-cooled and liquid-cooled internal-combustion engines, heating and ventilation, metallurgy, fluid flow, compressed air, fuels and combustion, and lubrication. Rice: *Experimental Engineering*.

Messrs. Bridges, Van Note, Loewensberg and Mendenhall.

**M. E. 411, 412, 413. Machine Design.**

3-3-3

Prerequisites: M. E. 317, 318, 319, E. M. 313, E. M. 322.

Required of seniors in Mechanical Engineering I.

Application of mechanics, kinematics, strength of materials, and metallurgy to the design of machinery; determination of proper materials, shape, size, and strength of various machine parts. Vallance: *Design of Machine Members*. Mr. Hoefer.**M. E. 421, 422, 423. Internal-Combustion Engines.**

3-3-3

Prerequisites: M. E. 307, 308, 309.

Required of seniors in Aeronautical Engineering.

Thermal and mechanical characteristics of internal-combustion engines; with special reference to the design, construction, operation and performance of automotive, aircraft and Diesel engines and their accessories. Lichtry, *Internal Combustion Engines*; current periodicals.

Messrs. Rice and Loewensberg.

**M. E. 425, 426, 427. Internal Combustion Engines Laboratory.**

1-1-1

Prerequisites: M. E. 307, 308, 309.

Concurrent with M. E. 401, 402, 403 or M. E. 421, 422, 423.

Advanced study and testing of internal-combustion engines; their auxiliaries, and the materials used in their construction; fuels and lubricants. Rice: *Experimental Engineering*. Messrs. Bridges and Rice.

**M. E. 431, 432, 433. Theory of Welding.** 1-1-1

Prerequisites: M. E. 123 or equivalent.

Required of seniors in Mechanical Engineering IV.

A study of the fundamental gas and electric welding processes including equipment, materials and procedure. Special attention will be paid to the factors affecting welding and welds such as control of residual stresses, shrinkage and warpage, and weldability of metals, joint design, etc. *Handbook of the American Welding Society.*

Mr. Cope.

**M. E. 435, 436, 437. Welding Practice.** 1-1-1

Prerequisites: M. E. 123 or equivalent.

Required of seniors in Mechanical Engineering IV.

Fundamentals in the techniques of gas, D. C. and A. C. Welding.

Mr. Cope.

**M. E. 441, 442, 443. Physical Metallurgy.** 2-2-2

Prerequisites: M. E. 322, 323.

Required of seniors in Mechanical Engineering IV.

Phase rule and its industrial applications; hardenability, carburizing; grain size control; reactions in the solid state; surface reaction processes; significance and inter-relation of static and dynamic properties; effects of temperature upon physical properties; current technical literature.

Mr. Van Note.

**M. E. 445, 446, 447. Furniture Construction.** 3-4-5

Prerequisites: M. E. 341, 342, 343.

Required of seniors in Mechanical Engineering II.

Theory and practice in construction and finishing; factory processes and layout for quantity production. Dean: *Modern American Period Furniture.*

Mr. Rowland.

**M. E. 451, 452, 453. Heating and Air-Conditioning II.** 3-3-3

Prerequisites: M. E. 307, 308, 309 and M. E. 313, 314, 315.

Required of seniors in Mechanical Engineering III.

Principles of heating, ventilation, and refrigeration as applied to air-conditioning; design and operation of air-conditioning systems. Allen and Walker: *Heating and Air-Conditioning.* Messrs. Rice and Vaughan.

M. E. 455, 456, 457. Heating and Air-Conditioning Lab.	1-1-1
Prerequisites: M. E. 313, 314, 315.	
Required of seniors in Mechanical Engineering III.	
Testing heating and air-conditioning units, systems and controls; testing refrigerating equipment, ducts, methods of air-distribution, fuel-burning equipment, dust-control equipment, heat-resisting materials. <i>American Society of Heating and Ventilating Engineers' Guide.</i>	Mr. Rice.
M. E. 458, 459. Heating and Air-Conditioning Design.	0-3-3
Prerequisites: M. E. 307, 308, 309 and M. E. 313, 314, 315.	
Required of seniors in Mechanical Engineering III.	
Design calculations from given conditions for a heating plant and an air-conditioning system; materials listed and cost of installation estimated. <i>American Society of Heating and Ventilating Engineers' Guide.</i>	
	Messrs. Rice and Vaughan.
M. E. 461, 462, 463. Experimental Engineering.	3-3-3
Prerequisites: M. E. 313, 314, 315 or equivalent as approved by faculty group.	
Advanced engineering principles applied to a specific project dealing with heat, power, hydraulic machinery, metallography, aerodynamics, or general experimental work. A seminar period provided, and a written report required.	
	Messrs. Rice, Vaughan, and Wheeler.
<b>Courses for Graduates Only</b>	
M. E. 501, 502, 503. Advanced Engineering Thermodynamics.	3-3-3
Prerequisites: M. E. 307, 308, 309 and M. E. 407, 408, 409.	
Development of the thermodynamic equations and their application to advanced engineering problems.	
	Messrs. Hoefer and Rice.
M. E. 505, 506, 507. Internal-Combustion Engine Design.	3-3-3
Prerequisites: M. E. 421, 422, 423 and 407, 408, 409.	
A thorough study of the field of internal-combustion engines; design of an engine to meet specific requirements. Pye: <i>Internal-Combustion Engines</i> Vol. I and II.	
	Mr. Rice.
*M. E. 513, 514, 515. Power Plant Design.	3-3-3
Prerequisites: M. E. 401, 402, 403 and M. E. 307, 308, 309.	
The design of a plant to fulfill conditions obtained by investigation and research; specifications for design and installation.	
	Messrs. Hoefer and Vaughan.

\* Only one of these courses to be offered during any College year.

\*M. E. 517, 518, 519. Design of Heating and Ventilating System. 3-3-3

Prerequisites: M. E. 404 or M. E. 451, 452, 453 and M. E. 407, 408, 409.

The design of a heating system for specific conditions; specifications for installation; performance tests of heating equipment.

Messrs. Rice and Vaughan.

M. E. 521, 522, 523. Mechanical Engineering Research. 3-3-3

Prerequisites: M. E. 401, 402, 403 and M. E. 404.

Research and thesis in connection with M. E. 513, 514, 515 or M. E. 517, 518, 519 or M. E. 505, 506, 507.

Messrs. Rice, Vaughan.

### MILITARY SCIENCE AND TACTICS

(For the duration of the war only Military 101, 102, 103, 201, 202, and 203 will be offered.)

**Military 101, 102, 103.** 2-2-2

Military Science I (Branch immaterial).

This, the first-year basic course, is required of all physically fit freshmen.

Concealment and Camouflage, Cover and Movement, Dismounted Drill, Equipment and Clothing, Extended Order, Field Sanitation, First Aid, Interior Guard Duty, Map and Photograph Reading, Marches and Bivouacs, Military Courtesy and Discipline, Organization of the Army, Patrol Operations, Personal and Sex Hygiene, Protection against Carelessness, Rifle, Scouts Observers and Messengers, Tent Pitching.

**Military 201, 202, 203.**

**Mil. 111, 112, 113. Military Science I (Signal Corps)** 2-2-2

This, the first-year basic course, is required of all physically fit freshmen enrolled in the Electrical Engineering School. Freshmen from other Engineering Schools may be selected for the Signal Corps course in order to fill the allotted War Department quota.

The National Defense Act and the R.O.T.C., Military Courtesy and Discipline; Military Hygiene and First Aid; Leadership; Rifle Marksmanship; Map Reading; Military Organization, General; Signal Corps Organization; Military History and Policy; Obligations of Citizenship; Signal Communication; Field Wire Systems and Material of Wire Communication.

**Mil. 201, 202, 203.** 2-2-2

Military Science II (Branch immaterial).

This, the second-year basic course, is required of all physically fit sophomores who have completed Military Science 101.

Training Management, Dismounted Drill, Administration, Extended Order Drill, Application of Military Law, Rifle Marksmanship, Tactical Training and Combat Organization, Defense against Chemical Attack, Unit Supply, Map and Photograph Reading.

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\* Only one of these courses to be offered during any College year.

**Mil. 211, 212, 213. Military Science II (Signal Corps).**

2-2-2

This, the second-year basic Signal Corps course, is required of all physically fit sophomores who have successfully completed Military Science I (Signal Corps).

Leadership; Signal Communication; Radio Communication, Radio Code Practice, Field Radio Systems; Organization of the Signal Corps, Interior Guard Duty, Automatic Rifle.

**Mil. 301, 302, 303. Military Science III. (Infantry).**

3-3-3

Prerequisite: M. S. II.

This, the first-year advanced course, is elective for selected juniors.

Aerial Photograph Reading; Leadership; Machine Gun, 37 MM. Gun, Three-inch Trench Mortar; Combat Principles; Supply and Mess Management; Field Fortifications; Care and Operation of Motor Vehicles; Defense Against Chemical Warfare.

**Mil. 311, 312, 313. Military Science III (Signal Corps).**

3-3-3

Prerequisite: M.S. II (Signal Corps).

This, the first-year advanced Signal Corps course, is elective for selected juniors.

Aerial Photograph Reading; Defense Against Chemical Warfare; Military Administration, Supply and Mess Management; Organization of the Army, Organization of the Signal Corps; Leadership; Automatic Rifle; Signal Communications, Homing Pigeons, Military Cryptography, Message Centers, Wire Communications, Field Wire Systems; Radio Communication, Code Practice, Field Radio Systems; Signal Communication Tactics, Combat Orders, General and Signal Orders, Combat Principles; Tactical Signal Communications.

**Mil. 401, 402, 403. Military Science IV. (Infantry).**

3-3-3

Prerequisite: M. S. III.

This, the second year advanced course, is required of all seniors who have completed the first-year advanced course.

Military Law; Officers Reserve Corps Regulations; Military History and Policy; Anti-Aircraft Defense; Leadership; Combat Principles of the Rifle Company; Heavy Weapons Company; Tanks and Mechanization; Combat Intelligence; and Signal Communications.

Credit will be given for work at other institutions maintaining a Senior unit of the Reserve Officers Training Corps as shown by the student's record, Form 131 A. G. O., evaluated and kept by the Professor of Military Science and Tactics.

**Mil. 411, 412, 413. Military Science IV (Signal Corps).**

**Prerequisite:** M. S. III (Signal Corps).

Military Law; Officers Reserve Corps Regulations; Methods of Instruction and Training; Motor Transportation; Signal Supply; Property Procurement and Funds; Combat Orders; Tactics; Leadership; Signal Communication; Military Cryptography; Message Center Procedure; Radio Communication; Code Practice; Field Radio Systems; Wire Communication; Material of Wire Communication; Field Wire Systems; Organization of the Signal Corps; Organization of Military Signal Communications.

## MODERN LANGUAGES

### Basic Courses

#### French

**\*M. L. 101, 102. Elementary French.**

3-3-0 or 0-3-3

Lectures on the structure, diction, pronunciation; and other matters of technique of the language, supplemented by easy readings and translations. Individual reports and conferences. No previous training in the language necessary.

Mrs. Hall.

**\*M. L. 201. Elementary French Prose.**

3 or 3 or 3

**Prerequisites:** M. L. 101, 102 or equivalent.

**Military French.** For the duration, the object of this course will be the development of ability in written and spoken French dealing with army, navy, and aeronautical affairs.

Mr. Ballenger and Mrs. Hall.

**M. L. 202. Intermediate French Prose.**

3-0-0

**Prerequisite:** M. L. 201 or equivalent.

A study of prose reading material, largely historical in nature. Attention given to the acquisition and extension of the student's basic vocabulary. Individual translation, parallel readings, and reports.

Mr. Ballenger.

#### German

**\*M. L. 103, 104. Elementary German.**

3-3-0 or 0-3-3

Lectures on the structure and technique of the language, supplemented by easy readings and translations. Individual reports and conferences.

Mr. Hinkle.

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\* Two years of high-school work will ordinarily be considered the equivalent of M. L. 101, 102, and 201; and of 103, 104, and 203.

**\*M. L. 203. Elementary German Prose.**

3 or 3 or 3

Prerequisites: M. L. 103, 104 or equivalent.

**Military German.** For the duration, the object of this course will be the development of ability in written and spoken German dealing with army, navy, and aeronautical affairs.

Mr. Hinkle and Mrs. Hall.

**M. L. 204. Intermediate German Prose.**

3-0-0

Prerequisites: M. L. 203 or equivalent.

A study of prose reading material, largely historical in nature. Attention given to the acquisition and extension of the student's basic vocabulary. Individual translations, parallel readings and reports.

Mr. Hinkle.

**Spanish****\*M. L. 105, 106. Elementary Spanish.**

3-3-0 or 0-3-3

Lectures on the structure, diction, pronunciation, and other matters of technique of the language, supplemented by easy readings and translations. Individual reports and conferences. No previous training in the language necessary.

Messrs. Ballenger and Hinkle.

**\*M. L. 205. Elementary Spanish Prose.**

3 or 3 or 3

**Military Spanish.** For the duration, the object of this course will be the development of ability in written and spoken Spanish dealing with army, navy, and aeronautical affairs.

Messrs. Ballenger and Hinkle.

**M. L. 206. Intermediate Spanish Prose.**

3-0-0

Prerequisite: M. L. 205 or equivalent.

A study of prose reading material, largely historical in nature. Attention given to the acquisition and extension of the student's basic vocabulary. Individual translations, parallel readings, and reports.

Mr. Ballenger.

**\*\*Technical and Scientific Courses**

**Translation Service.**—A special feature of the work of the Modern Language department is that of the Translation Service. This work is conducted as an aid to research, on the one hand, and a means to the acquisi-

\* Two years of high-school work will ordinarily be considered the equivalent of M. L. 105, 106, and 205.

\*\* Students registered in advanced technical and scientific courses are given the opportunity of doing a translation project in connection with the Translation Service of the department. When such prospect is satisfactorily completed and accepted, it may be substituted in lieu of an examination as evidence of reading ability. This procedure is recommended as the preferable method of preparation for the acquisition of a reading knowledge of the language concerned.

tion of a reading knowledge of the respective language, on the other. Through this service advanced undergraduate students and graduate students registered in technical and scientific courses are given the opportunity of working a translation project in connection with their field of major interest. When such project is satisfactorily completed, it is accepted in lieu of an examination as evidence of reading ability. This procedure is recommended as the preferable method of preparation for the acquisition of a reading knowledge of the language concerned. Revised copies of these projects are deposited in our local library and made available to investigators in other institutions through the medium of the American Documentation Institute.

**M. L. 301. Technical French.**

0-3-0

**Prerequisite:** M. L. 202 or equivalent.

Readings and translations of relatively simple technical material, supplemented by lectures on terminology, vocabulary analysis, and other linguistic technique. Designed to meet the needs of students whose interest in the language is primarily that of reading ability. Choice of reading material adjusted to individual needs; may be taken by students of varying degrees of previous linguistic training.

Mr. Ballenger.

**M. L. 302. Introductory Scientific French.**

0-0-3

**Prerequisite:** M. L. 202 or equivalent.

A study of scientific French of intermediate difficulty, supplemented with lectures on terminology and other linguistic technique. The needs of students whose interest is that of the acquisition of a reading knowledge of the language, constantly kept in view. Basic technique of translation explained and demonstrated by means of personal conferences.

Mr. Ballenger and Mrs. Hall.

**M. L. 303. Technical German.**

0-3-0

**Prerequisite:** M. L. 204 or equivalent.

Reading and translations of relatively simple technical German, supplemented by lectures on terminology, word order, vocabulary analysis and other linguistic technique. Designed to meet the needs of students whose interest in the language is primarily that of reading ability. Choice of reading material adjusted to individual needs; may be taken by students of varying degrees of previous linguistic training.

Mr. Hinkle.

**M. L. 304. Introductory Scientific German.**

0-0-3

A study of scientific German of intermediate difficulty supplemented with lectures on terminology and other linguistic technique. The needs of students whose interest is that of the acquisition of a reading knowledge of the language, constantly kept in view. Basic technique of translation explained and demonstrated by means of personal conferences.

Mr. Hinkle and Mrs. Hall.

**M. L. 305. Technical and Industrial Spanish.**

0-3-0

Prerequisite: M. L. 206 or equivalent.

A study of technical and industrial literature. Particular attention given to the special terminology characteristic of such literature with a view to the acquisition of a practical vocabulary. Individual conferences and reports.

Mr. Ballenger.

**M. L. 306. Introductory Scientific Spanish.**

0-0-3

Prerequisite: M. L. 206 or equivalent.

Readings and translations of relatively simple scientific Spanish, supplemented by lectures on terminology, vocabulary analysis, and other linguistic technique. Designed to meet the needs of students whose interest in the language is primarily that of reading ability. Choice of reading material adjusted to individual needs; may be taken by students of varying degrees of previous linguistic training.

Mr. Ballenger.

**M. L. 401, 402, 403. Advanced Scientific French.**

3-3-3

Prerequisite: M. L. 301 or 302 or equivalent.

A study of scientific literature appearing in current bulletins, magazines and technical journals. Students given the opportunity of working a translation project in connection with their subject of major interest. Special attention given to the comprehension of the thought of the article under consideration and its accurate rendition into English. Parallel readings, reports and conferences.

Messrs. Hinkle and Ballenger.

**M. L. 404, 405, 406. Advanced Scientific German.**

3-3-3

Prerequisite: M. L. 303 or 304 or equivalent.

A study of scientific literature appearing in current bulletins, magazines, and technical journals. Students given the opportunity of working a translation project in connection with their subject of major interest. Special attention given to the comprehension of the thought of the article under consideration and its accurate rendition into English. Parallel readings, reports, and conferences.

Mr. Hinkle and Mrs. Hall.

**M. L. 407, 408, 409. Advanced Scientific Spanish.**

3-3-3

Prerequisite: M. L. 305 or 306 or equivalent.

A study of scientific literature appearing in current bulletins, magazines, and technical journals. Students given the opportunity of working a translation project in connection with their subject of major interest. Special attention given to the comprehension of the thought of the article under consideration and its accurate rendition into English. Parallel readings, reports, and conferences.

Mr. Ballenger and Mrs. Hall.

## General Courses

**M. L. 410. Masterpieces of French Literature.** 3-0-0

Prerequisite: Junior or Senior Standing.

The study of outstanding masterpieces of French literature. A brief outline of French literary development. Parallel reading either in translation or in French. An open elective. No language prerequisites.

Mr. Hinkle.

**M. L. 411. Masterpieces of German Literature.** 0-3-0

Prerequisite: Junior or Senior Standing.

The study of outstanding masterpieces of German literature. A brief outline of German literary development. Parallel readings either in translation or in German. An open elective. No language prerequisites.

Mr. Hinkle.

**M. L. 412, 413. Masterpieces of Spanish Literature.** 0-3-3

Prerequisite: Junior or Senior Standing.

The study of outstanding masterpieces of Spanish literature. A brief outline of Spanish literary development. Parallel readings either in translation or in Spanish. An open elective. No language prerequisites.

Mr. Hinkle.

**M. L. 414, 415. French, German and Spanish Civilization.** 3-0-3

Prerequisite: Junior or Senior Standing.

Lectures and reports on the manners and customs of the respective cultures under consideration. Fall Term devoted to their development in Europe; Spring Term devoted to Latin America. Topics, such as racial stocks, people, social classes, governments, politics and education given special consideration. Parallel readings, reports, and conferences. An open elective. No language prerequisites.

Mr. Hinkle.

**M. L. 416. The Development of Language.** 0-3-0 or 3-0-0

Prerequisite: Junior or Senior Standing.

The various phases of linguistic growth as a basis for intelligent language appreciation. Origin of language, linguistic change, grammatical categories, dialects, standard language, word order, inflection, isolation, agglutination, etymology, and other linguistic processes given special consideration. Parallel readings, reports, and conferences. An open elective. No language prerequisites.

Mr. Hinkle.

**M. L. 417. Masterpieces of Foreign Literature.**

0-0-3 or 3-0-0

Prerequisite: Junior or Senior Standing.

A study of outstanding literary productions in each of the various types of literature, and lectures on their cultural background. Designed primarily to meet the needs of students who wish to supplement their knowledge of their own literature with a survey of the literature of other civilizations. Special attention is given to the literary monuments of France, Germany, Spain, and Italy. No foreign language prerequisites are necessary. Daily reports and conferences.

Mr. Hinkle.

**PHYSICAL EDUCATION AND ATHLETICS****Courses and Activities****P. E. 101, 102, 103. Fundamental Activities and Hygiene.**

1-1-1

Required of all freshmen except those excused on the recommendation of the College physician.

Individual health and physical efficiency of each student based on standaridized athletic, gymnastic, and efficiency tests. Lectures on personal hygiene required in one term only.

Mr. Miller and Staff.

**P. E. 201, 202, 203. Sports Activities.**

1-1-1

Prerequisites: P. E. 101, 102, 103.

Required of all sophomores except those excused upon recommendation of the College physician.

Election is permitted in popular sports for healthful exercise and a fair degree of skill in them.

Mr. Miller and Staff.

**P. E. 111, 112, 113. Restricted Activities.**

1-1-1

Required of all freshmen excused from P. E. 101, 102, 103.

Special activities for those students who cannot meet the requirements of the regular course because of physical handicap.

Mr. Miller and Staff.

**P. E. 211, 212, 213. Restricted Activities.**

1-1-1

Required of all sophomores excused from P. E. 201, 202, 203.

Special activities for those students who cannot meet the requirements of the regular course because of physical handicap.

Mr. Miller and Staff.

P. E. 301, 302, 303. Theory and Practice of First Aid. 1 or 1 or 1

Elective for juniors and seniors.

Hours by arrangement.

Anatomy and physiology sufficiently to proceed with bandages, dressings, wounds, shock, injuries to bones, joints, muscles, poisons, unconsciousness, artificial respiration, and common emergencies. Students completing the course are awarded the American Red Cross Certificate. Staff.

P. E. 401. Social Recreation. 0-0-3

Elective for juniors and seniors in Agr. Educ.

Purpose: To prepare teachers of agriculture to assume leadership in social and recreational activities. The organization, supervision, and practice work in athletic and social activities for parties, picnics, campus banquets, and similar occasions. Mr. Miller.

## PHYSICS

### Courses for Undergraduates

Phys. 111, 112, 113. Physics for Textile Students. 4-4-4

Required of freshmen in Textiles.

Industrial Physics, with emphasis on practical applications to the textile industry. Black: *College Physics*. Messrs. Hopkins, and Lancaster.

Phys. 115. Physics for Agricultural Students. 5 or 5 or 5

Required of sophomores in Agriculture.

Elements of machines; physics of heat and weather; applications of light and electricity on the farm. Henderson: *The New Physics of Everyday Life*. Messrs. Heck, Brown.

Phys. 123. Descriptive Astronomy. 0-0-3

Elective.

An elementary nonmathematical survey of the sun, planets, and stars; observations with telescope. Baker: *Introduction to Astronomy*.

Mr. Heck.



<b>Phys. 405, 406. Electricity and Magnetism.</b>	3-3-0 or 4-4-0
Prerequisites: Phys. 203. Math. 303.	
Elective.	
Fundamental principles in a more specialized but intermediate manner. Laboratory, if taken, increases the course to 4 credits. Gilbert: <i>Electricity and Magnetism.</i>	Mr. Lancaster.
<b>Phys. 407. Elementary Modern Physics.</b>	3 or 3 or 3
Prerequisites: Phys. 203, Math. 303, Chem. 211.	
Required of juniors in E. E. and seniors in Ch. E.	
New theories and discoveries in Physics, such as: the electron, atomic structure, spectra, X-rays, crystal structure, quantum theory, radiation, radio-activity, isotopes and cosmic rays. Brown: <i>Foundations of Modern Physics.</i>	Mr. Derieux.
<b>Phys. 413. Acoustics.</b>	0-3-0
Prerequisites: Phys. 203. Math. 303.	
Elective.	
Production, propagation, transmission, and reception of sound, with special applications to architectural and electrical transmission problems. Olson: <i>Elements of Acoustical Engineering.</i>	Staff.
<b>Phys. 415, 416. Light.</b>	0-3-3 or 0-4-4
Prerequisites: Phys. 203 or 207. Math. 303.	
Elective.	
Introduction to principles of geometrical and physical optics. Edser: <i>Light for Students.</i>	Mr. Derieux.
<b>Phys. 417. Heat.</b>	3-0-0
Prerequisites: Phys. 203 or 207. Math. 303.	
Elective.	
Temperature measurement, specific heats, thermal expansion, conduction, radiation, kinetic theory, change of state, thermodynamics, low temperatures, high temperatures. Cork: <i>Heat.</i>	Mr. Lynn.
<b>Phys. 426. Spectroscopy in Industry.</b>	0-3-0 or 0-4-0
Prerequisites: Phys. 203. Chem. 212.	
Fundamental principles of light; spectroscopic equipment; spectra; qualitative analysis of composition by emission spectra; detection of impurities; quantitative analysis; absorption spectra; industrial applications, lectures, demonstrations, and laboratory. Lewis: <i>Spectroscopy in Science and Industry;</i> Brode: <i>Chemical Spectroscopy.</i>	Mr. Derieux.

Phys. 427, 428, 429. Optics.	3-3-3 or 4-4-4
Prerequisite: Phys. 203, Math. 303.	
Lenses and lens system, optical instruments, gratings, interferometers, spectra. Laboratory if taken gives 4 credits.	Mr. Derieux.
Phys. 443. History of Physics.	0-0-3
Prerequisite: One course in College Physics.	
Elective.	
Development of Physics from its beginnings to the present time. Crew: <i>Rise of Modern Physics.</i>	Mr. Heck.
Phys. 445, 446, 447. Research.	3-3-3
Prerequisite: Phys. 203 or 207 or 213.	
Elective.	
Undergraduate research given according to the student's ability.	Mr. Heck.
Phys. 451, 452, 453. Physics Colloquium.	3-3-3
Current research reviewed by department and advanced students; meets weekly at night throughout the year.	Mr. Heck.
Phys. 463. Industrial X-Rays.	0-0-3
Prerequisites: Phys. 203, Math. 303.	
Theory and practice of X-rays in industry; X-ray equipment; photographic procedure; detection of defects in welds, castings, assemblies, stresses in members and fibers and crystal analysis demonstrations and student manipulation in each phase. Clark: <i>Applied X-rays</i> . St. John: <i>Industrial Radiography.</i>	Staff.
Phys. 514, 515, 517. Advanced Theory of Electricity and Magnetism.	3-3-3
Prerequisites: Phys. 203, Math. 301.	
Theorem of Gauss, energy in media, boundary conditions, condensers, electrometers, dielectric constants, migration of ions, thermodynamics of reversible cells, thermoelectricity, magnetic circuits, growth and decay of currents, oscillatory discharge. Starling: <i>Advanced Theory of Electricity and Magnetism.</i>	Staff.

**Phys. 522. Discharge of Electricity in Gases.** 0-3-0

Prerequisites: Phys. 213, Math. 203.

Production of ions in gases, motion of ions, velocity in an electric field, diffusion, recombination, determination of atomic charge, ionization by collision, discharge tubes, cathode rays, positive rays, and X-rays. Crowther: *Ions, Electrons, and Ionizing Radiations.* Mr. Derieux.

**Phys. 525. Atomic Structures.** 3-0-0

Prerequisite: Phys. 312.

Elective.

Bohr's model, spectral formula, elliptical orbits, fine structure of spectral lines, Stark effect, Zeeman effect, Roentgen rays, Moseley's law, periodic system, isotopes, radioactivity, atomic nuclei, ionization, spectra and atomic structure, fluorescence, atomic magnetism. White: *Atomic Spectra.* Haas: *Atomic Structures.* Staff.

**Phys. 531, 532, 533. Research.** 3-3-3

Graduate students sufficiently prepared may undertake research in some particular field of Physics. At least six laboratory hours a week must be devoted to such research. Messrs. Heck and Derieux.

## POULTRY

### Courses for Undergraduates

**Poul. 201. General Poultry.** 3-0-0

Required of sophomores in Agriculture.

Fundamental principles of poultry production.

Messrs. Williams and Dearstyne.

**Poul. 301. Poultry Judging.** 4-0-0

Prerequisite: Poul. 201.

Required of juniors in Poultry Production; elective for others.

Mr. Williams.

**Poul. 303. Incubation and Brooding.** 0-0-3

Prerequisites: Phys. 115, Poul. 201.

Required of juniors in Poultry Production; elective for others.

Principles of incubation and brooding; feeding, housing, and rearing baby chicks. Mr. Williams.

Poul. 311, 312. Poultry Anatomy and Physiology.	3-3-0
Required of juniors in Poultry Science; elective for others.	
A foundation for courses in poultry diseases and nutrition.	
	Mr. Gregory.
Poul. 322. Poultry Production.	0-4-0
Prerequisite: Poul. 201.	
Developed for vocational teachers of agriculture. Elective for others.	
Poultry disease problems; nutritional problems; judging methods.	
	Messrs. Dearstyne and Williams.
Poul. 332. Preparation and Grading of Poultry Products.	0-3-0
Prerequisite: Poul. 201.	
Required of juniors in Poultry; elective for others.	
Commercial fattening; grading and marketing eggs; refrigerating and storage; markets.	
	Mr. Williams.
Poul. 333. Poultry Nutrition.	0-0-4
Prerequisites: Chem. 101, Zool. 101 and 102, Poul. 201.	
Required of juniors in Poultry Production; elective for juniors in Agriculture.	
Feeds and feeding: Physiology of digestion, absorption, and elimination; mineral and vitamin requirements.	
	Messrs. Dearstyne and Gregory.
Poul. 342. Turkey Production.	0-3-0
Prerequisites: Poul. 101, Zool. 411.	
Required of seniors in Poultry Science; elective for others.	
Selection and mating; incubation: brooding poult; nutrition; grading and marketing.	
	Mr. Nesbit.

#### Courses for Advanced Undergraduates

Poul. 401, 402. Poultry Diseases.	4-4-0
Prerequisites: Poul. 201, Zool. 102, Poul. 401 prerequisite to Poul. 402.	
Required of seniors in Poultry Science; elective for others.	
Sanitation, parasite infestations and control, contagious and noncontagious diseases.	
	Mr. Gauger.

<b>Poul. 403. Sero-Diagnosis in Poultry Diseases.</b>	0-0-3
Prerequisites: Poul. 401, 402, Bot. 402.	
Required of seniors in Poultry Science.	
Basic immunological theory and technique; its application in the therapy and diagnosis of poultry disease.	Mr. Greaves.

<b>Poul. 412. Commercial Poultry Plant Management.</b>	0-3-0
Prerequisite: Poul. 201.	
Required of seniors in Poultry Science; elective for others.	
Development and maintenance of a commercial plant; custom hatching, and commercial incubation; cost of production.	Mr. Williams.

<b>Poul. 413. Selection and Mating of Poultry.</b>	0-0-3
Prerequisites: Poul. 201, Genetics, Zool. 411.	
Required of seniors in Poultry Production, elective for juniors in Agriculture.	
Methods of recognition and selection for mating from both standard and utility standpoints; study of progeny performance.	Mr. Dearstyne.

<b>Poul. 423. Senior Seminar.</b>	0-0-3
Required of seniors in Poultry.	Mr. Dearstyne.

#### Courses for Graduates Only

<b>Poul. 501, 502, 503. Poultry Histology.</b>	3-3-3
Prerequisites: Poul. 311, 312, 401, 402, Zool. 461.	
General histology of the tissues, special histology of the various systems of the body.	Mr. Gregory.

<b>Poul. 511, 512, 513. Poultry Pathology.</b>	3-3-3
Prerequisites: Poul. 311, 312, 401, 501, 502, 503.	
Various disease processes.	Mr. Gregory.

<b>Poul. 521. Poultry Physiology.</b>	3-0-0
Prerequisites: Poul. 311, 312, 401, 402, 501, 502.	
Histology and pathology, emphasizing the effects of diseases on normal physiology.	Mr. Gregory.

300 [PSYCHOLOGY]

Poul. 531, 532, 533. Poultry Research. 3-3-3

Prerequisite: Eighteen term credits in Poultry.

Problems in Poultry nutrition, diseases, marketing, and breeding to be conducted as definitely outlined by the Department. Poultry Staff.

Poul. 541, 542, 543. Seminar. 3-3-3

Prerequisite: Eighteen credit hours in Poultry.

Mr. Dearstyne.

Poul. 551, 552, 553. Production Studies and Experiments. 3-3-3

Prerequisites: Poul. 201, 333, 401, 402.

Problems in poultry nutrition, and breeding, and in commercial poultry production and marketing. Mr. Dearstyne.

## PSYCHOLOGY

### Courses for Undergraduates

Psychol. 200. Introduction to Psychology. 3 or 3 or 3

A study of the general characteristics and development of human behavior, emphasizing the problems of motivation, emotion, learning, and thinking. Mr. Moffie.

Psychol. 201. Elementary Experimental Psychology. 3-0-0

Introduction to experimental psychology. One lecture and two laboratory periods per week. Mr. Moffie.

Psychol. 202. Psychology of Personality and Adjustment. 0-3-0

Prerequisite: Psychology 200.

A study of the factors involved in the development of the normal personality. Mr. Moffie.

Psychol. 303, 304. Educational Psychology. 3-3-0

Required of students in Education; elective for others.

Applications of psychology to education; problems of learning, motivation, interests; the measurement of educational efficiency; mental hygiene.

Mr. Moffie.

**Psychol. 337. Applied Psychology.** 0-3-0  
 Prerequisite: Psychology 200.  
 - The practical application of psychological principles in special fields: analysis of problems arising in business, professional, and everyday life; the psychological aspects of personnel selection. Mr. McGehee.

**Psychol. 338. Industrial Psychology.** 0-0-3  
 Prerequisite: Psychology 200.  
 The application of psychological principles to the problems of modern industry; factors involved in industrial learning, methods of work, monotony, fatigue, illumination, accidents, morale of workers. Mr. McGehee.

**Psychol. 390. Social Psychology.** 0-0-3  
 Prerequisite: Psychology 200.  
 Social applications of psychology: social stimulation, response, and attitudes. Mr. McGehee.

#### Courses for Advanced Undergraduates and Graduates

**Psychol. 411. Rural Social Psychology.** 3-0-0  
 For description of this course, see Rural Sociology 411. Mr. McGehee.

**Psychol. 470, 471, 472. Psychodiagnostic Techniques.** 3-3-3  
 Prerequisite: Six hours in Psychology.  
 Techniques of measuring intelligence, personality, aptitudes, and achievement. Practice in administration and interpretation of psychological tests. Messrs. McGehee, Moffie.

**Psychol. 476. Psychology of Adolescence.** 0-0-3  
 Prerequisites: Ed. 303, 304, or six credits in Psychology.  
 Mental growth, social development, and interests of adolescent boys and girls. Mr. Moffie.

**Psychol. 478. Individual Differences.** 0-3-0  
 Prerequisite: Six hours in Psychology.  
 Nature, extent, and practical implications of individual differences and individual variation. Mr. McGehee.

## Courses for Graduates Only

- Psychol. 512, 513, 514. Problems in Applied Psychology. 3-3-3  
 Prerequisite: Twelve hours in Psychology.  
 Individual and group research problems in educational, industrial, and social psychology. Messrs. McGehee, Moffie.

## RELIGION

(See Ethics, page 243)

## RURAL SOCIOLOGY

## Courses for Undergraduates

- Rural Soc. 302. Rural Sociology. 3 or 3 or 3  
 Prerequisites: Soc. 202, 203 or Econ. 201, 202, 203.  
 Required of juniors in Rural Sociology, seniors in Agricultural Economics, and juniors in certain Education curricula.  
 The culture, social organization, and social problems of rural people with special reference to Southern rural life and proposed programs of development. Staff.

- Rural Soc. 401. Rural Leadership. 3-0-0  
 Social role of leadership; types and numbers of leaders; sources and backgrounds; motivation and personal traits; experience, training, and education; how leaders gain and hold power; adjustment of leadership to the changing environment; biographies of different types of leaders; and new opportunities for rural leadership. Mr. Winston.

## Courses for Graduates and Advanced Undergraduates

- Rural Soc. 402. Farmers' Movements. 0-3-0  
 The origin, growth, and the present status of such National farmers' organizations and movements as: the Grange, the Farmers' Alliance, the Populist Revolt, the Agricultural Wheel, the Farmers' Union, the Society of the Equity, the Nonpartisan League, the Farm Bureau, the Farm-Labor Union, the Coöoperative Marketing Movement. Mr. Seegers.

- Rural Soc. 411. Rural Population Problems. 3-0-0  
 The number and distribution in relation to natural resources; physical and demographic characteristics; marriage rates; natural increase; migration; morbidity; mortality; occupations; rural-urban comparisons; trends; and national policies. Mr. Hamilton.

**Rural Soc. 413. Community Organization.**

0-0-3

Prerequisite: Rural Soc. 302.

Required of seniors in Rural Sociology.

Community organization in North Carolina and other States: structure and size; institutions and service agencies; disorganization techniques and methods of organization; leadership and the relation of organizations to State and National agencies.

Mr. Mayo.

**Rural Soc. 421. Rural Social Psychology.**

3-0-0

Characteristic mental traits and attitudes of rural people in relation to social organization and social change.

Mr. McGehee.

**Rural Soc. 422. Social Aspects of Land Tenure.**

0-3-0

Character and history of different types of land tenure; origins and growth of farm tenancy in the United States; social correlatives of land tenure; landlord-tenant relationships; the farm leases; problems of ownership; farm mortgages; reform programs.

Mr. Hamilton.

**Rural Soc. 432. Rural Poverty and Relief.**

0-3-0

Origin, extent, and character of rural poverty; types and extent of relief; problems of prevention; public policies and programs.

Mr. Mayo.

**Rur. Soc. 451. Statistical Analysis of Social Data.**

3-0-0 or 0-0-3

Sampling social data, rural surveys and testing methods; analysis of variance and relationships; population studies. Application to problems in the fields of sociology, psychology and education.

Mr. Hamilton.

**Rural Soc. 453. Agricultural Extension and Education.**

0-0-3

History, objectives, and methods of agricultural extension and education in the United States.

Mr. Hamilton and Extension Staff.

**Courses for Graduates Only****Rural Soc. 531. Rural Standards of Living.**

3-0-0

Theories and surveys of rural standards of living. Forces and programs affecting present-day standards.

Mr. Hamilton.

**Rural Soc. 532. The Rural Family.**

0-3-0

Historical forms and functions of rural family life; family activities and relationships; stages of family growth; the family-sized farm; effects of technical and economic changes on the rural family; national policies.

Messrs. Hamilton, Winston.

**Rural Soc. 533. The Rural Community.**

0-0-3

Human ecology; types of communities; historical trends; economic, cultural, and psychological factors; solidarity and disorganization; special interest groups; service agencies; state and national relations; "Utopian" experiments; planning.

Mr. Mayo.

**Rural Soc. 541, 542, 543. Research in Rural Sociology.**

3-3-3

Objectives of research; the scientific method; planning, organization, and direction of rural studies; preparation of schedules, interviewing, editing, tabulation, and analysis; field experience; preparation of research reports.

Credit for 543 involves at least 6 weeks' field and laboratory experience.

Staff.

**SOCIOLOGY**

(For Courses in Rural Sociology see page 299)

**Courses for Undergraduates****Soc. 101, 102, 103. Human Relations.**

2-2-2

Required of students in the School of Agriculture who do not take Military Science. Elective for others.

An orientation course to introduce the student to the social problems of our time.

Staff.

**Soc. 201. Introductory Sociology.**

3-0-0 or 0-3-0 or 0-0-3

Required of students in Forestry; elective for others.

The basic principles underlying social life and the factors connected with it. (Identical with the first term of General Sociology.)

Mr. Winston.

**Soc. 202, 203. General Sociology.**

3-3-0

First term: an analysis of the fundamental factors affecting life in modern society; second term: practical social problems, using the tools developed in the first term.

Mr. Winston.

**Soc. 210. General Anthropology.**

3 credits

An introduction to the study of man: a consideration of his development from earliest forms to the present.

Mr. Winston.

## Courses for Graduates and Advanced Undergraduates

**Soc. Ex. 400. Criminology.** 3 credits

Prerequisite: Soc. 202, supplemented by credits in related fields.

Causes and conditions leading to crime; methods of handling criminals; various factors producing criminal behavior. Mr. Winston.

**Soc. 401. Social Pathology.** 0-0-3

Prerequisite: Soc. 202, supplemented by credits in related fields.

Pathological problems arising from social life; social and individual adjustments. Mr. Winston.

**Soc. Ex. 402. Sociology of City Life.** 3 credits

Prerequisite: Soc. 202, supplemented by credits in related fields.

Elective.

Problems arising from growth of modern town and city life; city planning in regard to social and industrial progress. Mr. Winston.

**Soc. 403. Leadership.** 3-0-0

Prerequisite: nine term credits in Sociology, including Sociology 202.

A study of leadership in various fields of American life: analysis of the various factors, inherent or acquired, that are associated with leadership, past and present. Mr. Winston.

**Soc. Ex. 404. Educational Sociology.** 3 credits

Prerequisite: nine term credits in the Social Sciences.

Application of the principles of Sociology to the practical problems of education with emphasis placed on the relation between adjustment processes in the school and in the larger social world. Mr. Winston.

**Soc. 406. The American Family.** 0-3-0

Prerequisite: Soc. 202, supplemented by credits in related fields.

Premarital, marital, and family relations; effects of present-day social changes; various efforts to stabilize the family. Messrs. Winston, Hamilton.

**Soc. 407. Race Relations.** 3-0-0

Prerequisite: Soc. 202, supplemented by credits in related fields.

Elective.

Race problems in America and in other countries; social, economic, and educational status of racial groups; international relations.

Mr. Winston.

Soc. 408. Social Anthropology. 3 credits  
 Prerequisites: Soc. 202 or Soc. 210, supplemented by credits in related fields.

Analysis of present-day culture, with particular reference to the United States and its regional variations. Mr. Winston.

Soc. 410. Industrial Sociology. 0-0-3  
 Prerequisite: Soc. 202, supplemented by credits in related fields.  
 Influence of industrial life; occupations as social and industrial factors; problems arising from our industrial era. Mr. Winston.

Soc. 411. Population Problems. 3-0-0  
 Prerequisite: Soc. 202, supplemented by credits in related fields.  
 Analyses of crucial problems connected with the growth and decline of populations in the United States; factors connected with birth and death rates; marriage rates; discussion of the changing quality of population groups. Mr. Winston.

Soc. 415. Research in Applied Sociology. 2-2-2  
 Prerequisite: nine hours of Sociology, and permission of the instructor.  
 Individual research problems in applied fields of sociology, such as problems of the family, of population, of social work; rural-urban relations; student success; American leadership. Mr. Winston.

### SOILS (AGRONOMY)

#### Courses for Undergraduates

Soils 201. Soils. 5-0-0 or 0-0-5  
 Prerequisites: Geol. 120 and Chem. 101, 102, 103.  
 Required of sophomores in Agriculture and Agricultural Chemistry, and of juniors in Forestry and Wildlife Conservation and Management.  
 The makeup, origin and classification of soils; the soil as a medium for plant growth. Messrs. Lutz, Colwell.

Soils 302. Fertilizers. 0-3-0  
 Prerequisite: Soils 201.  
 Required of juniors in Pomology, Vegetable Gardening, Field Crops, Floriculture, and Vocational Agriculture.  
 Sources, manufacture and characteristics of fertilizer materials; manufacture and evaluation of mixed fertilizers; factors affecting the choice and utilization of fertilizers; time and methods of application. Mr. Collins.

**Soils 303. Soil Management.** 0-0-3

Prerequisite: Soils 302.

Rotations, fertilizer recommendations, and other practical soil management problems for North Carolina soils and cropping systems.

Mr. Lutz.

**Soils 312. The Soils of North Carolina.** 0-3-0

Prerequisite: Soils 201. Required of juniors in Soils and Floriculture and of seniors in Wildlife Conservation, Vegetable Gardening, and Agricultural Economics (Farm Business Option).

The origin, characteristics, and classification of North Carolina soils; field trips.

Mr. Lee.

#### Courses for Graduates and Advanced Undergraduates

**Soils 401. Soil Development.** 3-0-0

Prerequisites: Soils 303, 312.

Genesis, morphology, and development of the great soil groups of the world.

Mr. Lutz.

**Soils 421. Soil Fertility Evaluating Methods.** 3-0-0

Prerequisites: Soils 302 and Chem. 213.

Analysis for total and available elements in the soil; the use of soil and plant analyses in soil diagnosis.

Mr. Piland.

**Soils 433. Soil Conservation and Land Use.** 0-0-3

Prerequisite: Soils 201.

Required of seniors in Soils and in Agricultural Engineering.

Factors affecting soil deterioration; soil conservation and land use.

Mr. Lutz.

**Soils 443. Soil Microbiology.** 0-0-3

See Botany 443.

Staff.

**Soils 463. Advanced Soil Fertility.** 0-0-3

Prerequisite: Soils 302.

Soil conditions affecting crop growth; the chemistry of soil and plant interrelationships; theoretical and applied aspects of fertilizer usage in relation to plant nutrition.

Mr. Cummings.

308 [Soils]

Soils 491, 492, 493. Special Problems.

3-3-3

Prerequisite: Admitted only with consent of the instructor.

Problems involving special library, laboratory or field studies of soils.

Staff.

Courses for Graduates Only

Soils 502. Advanced Fertilizers.

0-2-0

Prerequisite: Graduate standing in Soils.

Recent trends in the manufacture, characteristics and utilization of fertilizers; new developments in fertilizer experimentation. Offered in alternate years.

Mr. Collins.

Soils 512. Physical and Colloidal Chemistry of Soils.

0-5-0

Prerequisite: Graduate standing in Soils.

The origin and nature of inorganic and organic soil colloids; their behavior with respect to soil acidity, base exchange, absorption; and plant nutrition. Offered in alternate years.

Mr. Colwell.

Soils 522. Soil Physics.

0-5-0

Prerequisite: Graduate standing in Soils.

Physical constitution of soils, mechanical analysis, consistency and plasticity, structure, water relations, soil air and temperature. Offered in alternate years.

Messrs. Cummings, Lutz.

Soils 531, 532, 533. Seminar.

1-1-1

Prerequisite: Graduate standing in Soils.

Reports and discussions of problems in Soil Science.

Staff.

Soils 541, 542, 543. Soil Research.

Prerequisite: Graduate standing in Soils.

Research in specialized phases of Soil Science. By arrangement. Staff.

**TEXTILES****Courses for Undergraduates**

**Tex. 101, 102, 103. Textile Principles Laboratory.** 1-1-1

Required of freshmen in all Textile curricula.

Operation of plain and automatic looms, and carding and spinning machines.  
Messrs. Moser, Culberson.

**Tex. 105. Yarn Calculations.** 1-0-0

Required of freshmen in all Textile curricula.

Calculations for gears, pulleys, and machine speeds; systems of numbering yarns, and elementary yarn calculations.  
Mr. Grover.

**Tex. 131. Cloth Calculations.** 0-0-2

Required of freshmen in all Textile curricula.

Harness, reed and fabric calculations; loom production problems.

Mr. Moser.

**Tex. 205. Yarn Manufacture I.** 3-0-0 or 0-0-3

and

**Tex. 201, 202. Yarn Manufacture Laboratory I.** 1-1-0 or 0-1-1

Required of sophomores in all Textile curricula.

Mixing of cotton; description and setting of openers, pickers, cards and draw frames; production, speed and draft calculations; operation and fixing of machines; grinding and setting of cards; setting of draw frame rolls and construction of draw frames; weighting of rolls and types of roll covering.  
Messrs. Hilton, Culberson.

**Tex. 211. Knitting I.** 2-0-0 or 0-0-2

and

**Tex. 207, 208, 209. Knitting Laboratory I.** 1-1-1

Required of sophomores in all Textile curricula.

Selection and preparation of knitting yarns, knitting mechanisms, plain and rib knitting machines, circular ribbers, and circular automatic machines; operation of machines, practical experiments, hosiery analysis, topping, transferring, and looping.  
Mr. Lewis.

Tex. 234. Power Weaving.

0-2-0

and

Tex. 231, 232. Power Weaving Laboratory.

1-1-0 or 0-1-1

Required of sophomores in all Textile curricula.

Construction of auxiliary motions on plain looms; cams and their construction; drop-box loom construction; methods of pattern chain building; construction and value of pattern multipliers; timing of drop-box motion, and other motions.

Operation and fixing of plain, automatic and drop-box looms; pattern chain building for drop-box looms.

Messrs. Nelson, Moser.

Tex. 235, 236. Fabric Structure and Analysis.

2-2-0 or 0-2-2

Required of sophomores in all Textile curricula.

Systems of numbering woolen, worsted, silk, linen, rayon, and cotton yarn; plain, twill, and sateen weaves; ornamentation of plain weaves; wave designs; pointed twills; diamond effects; plain and fancy basket weaves; warp and filling rib weaves.

Analyzing plain, twill, sateen, and other fabrics made from simple weaves, ascertaining the number of ends and picks per inch in sample; fabric analysis calculations.

Messrs. Lewis, Moser.

Tex. 239. Principles of Textile Manufacturing I.

3-0-0

A study of the processes and machines used in textile manufacture, planned as an overview course for those preparing to be teachers of industrial arts in junior and senior high schools or in vocational schools.

Messrs. Nelson, Hilton.

## Courses for Advanced Undergraduates

Tex. 304. Yarn Manufacture II.

0-3-0

and

Tex. 301, 302, 303. Yarn Manufacture Laboratory II.

1-1-1

Prerequisites: Yarn Manufacture I, Tex. 201, 202, 205.

Required of juniors in Textile Manufacturing. Elective for others.

**Tex. 310, 311. Yarn Manufacture III.** 0-8-3  
and

**Tex. 307, 308, 309. Yarn Manufacture Laboratory III.** 2-2-2  
Prerequisites: Yarn Manufacture I, Tex. 201, 202, 205.

Required of juniors in Yarn Manufacture.

Construction of sliver lappers; ribbon lappers; combers; mechanical and electrical stop motions; description and setting of the different parts; care of machines; fly-frame builder and differential motions.

Operation and fixing of sliver lappers; ribbon lappers; combers and fly-frames; changing of hank roving, draft and twist; setting of drafting and speeder motions. Messrs. Hilton, Culberson.

**Tex. 316. Knitting II.** 0-3-0

and

**Tex. 313, 314, 315. Knitting Laboratory II.** 1-1-1

Prerequisites: Knitting I, Tex. 207, 208, 209, 211.

Elective for Textile Students.

Advanced circular mechanisms; hosiery design; auxiliary knitting machinery; warp and spring needle knitting; knitting machinery lay-out and organization. Production control and costs. Laboratory experiments.

Mr. Lewis.

**Tex. 335. Dobby Weaving.** 3-0-0 or 0-0-3

and

**Tex. 331, 332, 333. Dobby Weaving Laboratory I.** 1-1-1

Required of juniors in Textile Manufacturing and Yarn Manufacturing.  
Elective for others.

Mr. Hart.

**Tex. 337, 338, 339. Dobby Weaving Laboratory II.** 2-2-2

Prerequisites: Power Weaving, Tex. 231, 232, 234.

Required of juniors in Weaving and Designing.

Methods of drawing in and starting up cotton and rayon warps; setting of harness shafts; selection of springs or spring jacks. Construction and methods of fixing single and double index dobbies; methods of pattern-chain building.

Preparation of warps for weaving cotton and rayon fabrics on dobby looms; starting up warps in looms; fixing single and double index dobbies; pattern-chain building; operation of dobby looms. Messrs. Nelson, Hart.

**Tex. 341, 342. Fabric Design and Analysis I.** 3-3-0 or 0-3-3

Prerequisites: Fabric Structure and Analysis, Tex. 235, 236.

Required of juniors in Textile Manufacturing and Weaving and Designing. Elective for others.

Construction of fancy weaves, such as broken twills, curved twills, entwining twills; granite weaves; imitation leno; honeycomb weaves; fabrics backed with warp or filling; fabrics ornamented with extra warp or filling; combining weaves together to produce new patterns.

Analyzing samples of fancy fabrics for design, drawing in draft, reed, and chain plan; calculating particulars to reproduce fabrics from data obtained from sample.

Mr. Shinn.

**Tex. 343. Fabric Testing.** 0-0-1

Prerequisites: Fabric Structure and Analysis, Tex. 235, 236.

Required of juniors in Textile Manufacturing, Textile Chemistry and Dyeing, and Weaving and Designing.

Testing fabrics for strength; effect of heat upon fabrics; effect of regain upon tensile strength, elasticity of fabrics; micrometer and calculated tests for fabric thickness.

Mr. Grover.

**Tex. 344. Calculating Fabric Costs.** 0-3-0

Prerequisites: Fabric Structure and Analysis, Tex. 235, 236.

Elective for Textile students.

Special attention is given to distribution of costs to various productive processes, summarizing costs, the determination and use of unit costs, and the making of cost reports.

Mr. Shinn.

**Tex. 345. Textile Calculations I.** 0-0-3

Prerequisites: Fabric Structure and Analysis, Tex. 235, 236.

Required of juniors in Textile Manufacturing and Weaving and Designing. Elective for others.

An intensive course in calculations for designing, weaving, and analyzing cotton, rayon, silk, wool, worsted and linen yarns and fabrics; weight of fabrics, ends and picks per inch; costing of fabrics; reed and harness calculations; loom speed and production.

Mr. Hart.

**Tex. 347. Principles of Textile Manufacturing II.** 0-0-3

Prerequisites: Principles of Textile Manufacturing I, Tex. 239.

A study of the operation and care of textile machines, planned for those who are preparing to be teachers in vocational schools.

Messrs. Nelson, Hilton.

**Tex. 375. Dyeing I.** 3-0-0 or 0-0-3

and

**Tex. 371, 372, 373. Dyeing Laboratory I.** 1-1-1

Prerequisites: Chemistry 103.

Required of juniors in Textile Manufacturing. Elective for others.

Physical and chemical properties of textile fibres; chemicals used in preparing fibres for dyeing; methods of applying substantive, sulphur, basic, developed, acid, acid chrome, mordant and vat dyes; effect of changes in temperature and volume of the dye bath; theory of dyeing mixed fabrics; theory of mercerizing; tests for the chemical constituents of the fibres; dyeing experiments using all the different classes of dyes on the various fibres; tests showing effect of varying such factors as bath, temperature and time; test for fastness to light, washing, cross-dyeing, and so forth; mercerizing experiment.

Messrs. Grimshaw, Hayes.

**Tex. 381, 382. Dyeing II.** 3-3-0

and

**Tex. 377, 378, 379. Dyeing Laboratory II.** 2-2-2

Prerequisite: Chemistry 103.

Required of juniors in Textile Chemistry and Dyeing.

Physical and chemical properties of textile fibres; lectures on wool, silk, rayon, and cotton; hydrometers and chemicals used in dyeing and finishing; application of dyestuffs to different fibres; effect of changing bath, temperature, or time factor; money value and strength tests of dyes; theory of dyeing mixed fabrics; mercerizing.

Microscopic examination of textile fibres; dyeing experiments using different classes of dyes on textile fibres; tests showing the effects of varying such factors as bath, temperature, and time; fastness to light, washing, and cross dyeing; money value and strength of various dyes; mercerizing.

Messrs. Grimshaw, Hayes.

#### Courses for Graduates and Advanced Undergraduates

**Tex. 405. Yarn Manufacture IV.** 3-0-0 or 0-0-3

and

**Tex. 401, 402, 403. Yarn Manufacture Laboratory IV.** 1-1-1

Prerequisites: Yarn Manufacture, Tex. 301, 302, 303, 304.

Required of seniors in Textile Manufacturing. Elective for others.

Messrs. Hilton and Culberson.

Tex. 411, 412. Yarn Manufacture V.

3-3-0

and

Tex. 407, 408, 409. Yarn Manufacture Laboratory V.

2-2-2

Prerequisites: Yarn Manufacture, Tex. 307, 308, 309, 310, 311.

Required of seniors in Yarn Manufacturing.

Spinning; spooling; warping; twisting; description and setting of different parts; builder motions for warp and filling; bobbin holders, thread guides, traverse motions; ply yarns; calculations for twist, speed, and production.

Practical methods of spinning, warping, spooling, winding and twisting; setting of spinning rolls, spinning frame builder motions for warp, filling, and combination build; the practical application of all machines in Yarn Manufacture.

Messrs. Hilton, Culberson.

Tex. 413. Textile Calculations II.

3-0-0

Prerequisites: Yarn Manufacture II or III, Tex. 304 or 310, 311.

Required of seniors in Yarn Manufacturing. Elective for others.

Principles underlying the calculation of draft, twist, speed, and production; systems of numbering yarns; doubling and twisting yarns; lay, tension, differential, and cone drum calculations; practice in solving practical mill problems.

Mr. Hilton.

Tex. 415. Manufacturing Problems.

0-0-3

Prerequisites: Yarn Manufacture II or III, Tex. 304 or 310, 311.

Required of seniors in Yarn Manufacturing. Elective for others.

Mill organization and administration; machine layout for long and regular draft spinning; production control and costs; making of novelty yarns; making of daily and weekly reports; breaking of single and ply yarns; regular and reverse twisted yarns.

Mr. Hilton.

Tex. 416. Wool Manufacture I.

0-3-0

and

Tex. 417, 418. Wool Manufacture Laboratory I.

1-1-0

Prerequisites: Yarn Manufacture II or III, Tex. 304, or Tex. 310, 311.

Elective for seniors in Textile School.

Physical and chemical properties; reclaimed wool and secondary raw materials; grading; sorting; mixing and blending; oiling and garnetting; description of feeders; cards; tape condensers; card setting; stripping and grinding; woollen spinning; twister head; mechanical details and production; the practical application of machines in Woollen Yarn Manufacture.

Mr. Hilton.

**Tex. 420. Cotton Quality I.**

3-0-0

History, development, production, ginning, and handling of cotton. World crops; marketing methods; classification; relation of grade and staple to value of cotton.

Mr. Campbell.

**Tex. 421. Cotton Quality II.**

0-3-0

Laboratory measurement of the physical properties of cotton fibers; differences among varieties; relation of fiber properties to spinning quality; relation of grade and staple to waste, spinning behavior, and yarn quality. Selection of cotton for different types of yarns and fabrics.

Mr. Campbell.

**Tex. 435. Cotton, Wool and Rayon Weaving.**

0-0-3

and

**Tex. 431, 432. Cotton, Wool and Rayon Weaving Laboratory I.**

1-1-0

Prerequisites: Dobby Weaving, Tex. 331, 332, 333, 335.

Required of seniors in Textile Manufacturing. Elective for others.

Messrs. Nelson, Hart.

**Tex. 437, 438, 439. Cotton, Wool and Rayon Weaving Laboratory II.** 2-2-1

Prerequisites: Dobby Weaving, Tex. 335, 337, 338, 339.

Required of seniors in Weaving and Designing.

Principles of loom construction to weave rayon and fine cotton fabrics; pick and pick looms; box and multiplier chain-building; arrangement of colors in boxes to give easy running loom; extra appliances for weaving leno, towel, and other pile fabrics; construction and operation of single, double lift, and rise and fall jacquards; tie-up of harness for dress goods, table napkins, damask, and other jacquard fabrics, such as leno; relative speed of looms; production calculations and fabric costs.

Operation and fixing of dobby, pick and pick, and jacquard looms; preparation of warps to weave rayon, wool and fine cotton fabrics; building of box, dobby, and multiplier chains.

Messrs. Nelson, Hart.

**Tex. 441. Leno Design.**

3-0-0 or 0-3-0

Prerequisites: Fabric Design and Analysis I, Tex. 341, 342.

Required of seniors in Textile Manufacturing and in Weaving and Designing. Elective for others.

Leno weaves with one, two, or more sets of doups; combination of plain and fancy weaves with leno; methods of obtaining leno patterns; methods of making original designs for dress goods, draperies.

Messrs. Nelson, Shinn.

**Tex. 443. Dobby Design.**

3-0-0 or 0-3-0

Prerequisites: Fabric Design and Analysis I, Tex. 341, 342.

Required of seniors in Textile Manufacturing and in Weaving and Designing. Elective for others.

Designing fabrics, such as fancy crepes, figured double plain, matelasse, velvets, corduroys, pique, lines of samples.

Mr. Nelson.

**Tex. 445. Jacquard Design.**

0-0-3

Prerequisites: Fabric Design and Analysis I, Tex. 341, 342.

Required of seniors in Textile Manufacturing and juniors in Weaving and Designing. Elective for others.

Designing fancy and jacquard fabrics; methods of making original designs for table napkins, table covers, dress goods, draperies.

Messrs. Nelson, Shinn.

**Tex. 447, 448, 449. Jacquard Design Laboratory.**

1-1-1

Prerequisites: Jacquard Design, Tex. 445.

Required of seniors in Weaving and Designing.

Designing fancy and jacquard fabrics; methods of making original designs by combinations of color, weave, and sketches; designs for table napkins, table covers, dress goods, draperies.

Messrs. Nelson, Shinn.

**Tex. 451, 452. Fabric Analysis.**

2-2-0

Prerequisites: Fabric Design and Analysis, Tex. 341, 342.

Required of seniors in Textile Manufacturing and Weaving and Designing. Elective for others.

Analyzing samples of cotton, wool, worsted, linen, rayon, and silk fabrics for size of yarns, ends and picks per inch, weight of warp and filling, so as to accurately reproduce samples analyzed; obtaining design, drawing in draft, chain, and reed plan for fancy fabrics, such as stripes, checks, extra warp and extra filling figures, leno fabrics, jacquard fabrics, draperies.

Messrs. Nelson, Shinn.

**Tex. 453. Fabric Design and Analysis II.**

0-0-3

Prerequisites: Fabric Design and Analysis I, Tex. 341, 342.

Design and analysis of fancy fabrics; making fabrics from sketches and specifications.

Mr. Shinn.

**Tex. 455, 456. Color in Woven Design.**

3-3-0

Prerequisites: Fabric Structure and Analysis, Tex. 236, 237.

Required of seniors in Weaving and Designing. Elective for others.

Pigment and light theories of color; contrast and harmony of color; factors which influence quality, style, and color; methods of applying weaves and color to fabrics for wearing apparel and home decorations.

Mr. Hart.

**Tex. 457, 458, 459. Textile Testing.**

1-1-1

Prerequisite: Fabric Testing, Tex. 343 or equivalent.

Required of seniors in Weaving and Designing.

Tests for moisture content, regain, twist, and tensile strength; description and operation of testing equipment; solution and written reports of assigned textile problems.

Mr. Grover.

**Tex. 474. Cotton and Rayon Dyeing I.**

0-3-0

and

**Tex. 471, 472, 473. Cotton and Rayon Dyeing Laboratory I.**

1-1-1

Prerequisites: Dyeing I, Tex. 371, 372, 373, 375.

Required of seniors in Textile Manufacturing. Elective for others.

Lectures on color mixing, money value of dyes; testing of dyes, water, starch, and materials used in sizing; lubricating oils and oil compounds; processes and machinery used in dyeing and finishing; textile printing; apparatus used in research laboratory.

Color matching; testing dyes for strength and money value; physical and chemical examination and application of starches, sizing materials and finishing compounds; examination of textile oils, soap, and all the different rayons; analysis of mixed fabrics.

Messrs. Grimshaw, Hayes.

**Tex. 475. Textile Microscopy I.**

0-0-1

Prerequisites: Dyeing I or II, Tex. 375 or 381, 382.

Required of seniors in Textile Manufacturing. Elective for others.

Instruction in the use of the microscope; examination of fibres; preparation of permanent slides.

Messrs. Grimshaw, Hayes.

**Tex. 480, 481.** Cotton and Rayon Dyeing II. 0-3-3

and

**Tex. 477, 478, 479.** Cotton and Rayon Dyeing Laboratory II. 2-2-2

Prerequisites: Dyeing II, Tex. 377, 378, 379, 381, 382.

Required of seniors in Textile Chemistry and Dyeing.

Theories of color matching; lectures on color mixing, water and mold, starch, materials used in sizing; lubricating oils, textile oils and oil compounds; processes and machinery used in dyeing and finishing; method of analyzing textile fabrics; laboratory equipment used in textile research and testing laboratories.

Color matching; physical and chemical examination and application of textile oils, soaps, and finishing compounds; microscopic and chemical tests on rayons; dyeing various types of rayon; operation of dyeing and finishing equipment in the dye house and research laboratories.

Mr. Grimshaw.

**Tex. 487.** Textile Printing. 3-0-0

and

**Tex. 483, 484, 485.** Textile Printing Laboratory. 1-1-1

Prerequisites: Dyeing II, Tex. 381, 382.

The history of printing and the development of machinery used; calico printing and the mordant, basic, and vat colors, analine black, indigo, and insoluble azo colors; resist and discharge styles.

Paste mixing; practical experiments. Messrs. Grimshaw, Hayes.

**Tex. 489, 490.** Textile Microscopy II. 1-1-0

Prerequisites: Dyeing I or II, Tex. 375 or 381, 382.

Required of seniors in Textile Chemistry and Dyeing. Elective for others.

Instruction in the use of the microscope; examination of fibres; preparation of permanent slides. Messrs. Grimshaw, Hayes.

**Tex. 495.** Principles of Fabric Finishing. 0-0-3

and

**Tex. 491, 492, 493.** Principles of Fabric Finishing Laboratory. 1-1-1

Prerequisites: Dyeing II, Tex. 371, 372.

Elective for Textile students.

A study of machinery used in finishing of textile fabrics and in textile printing, with lectures and pictures; lectures on materials used in the textile finishing and printing industry and experiments. Mr. Grimshaw.

## Courses for Graduates Only

**Tex. 501, 502, 503. Yarn Manufacture.**

3-3-3

**Prerequisites:** Yarn Manufacture IV, Tex. 405 or equivalent.

A study of breaking strength and related properties of cotton yarns made under various atmospheric conditions; comparison of yarns produced from long and short-staple cotton with regular and special carding processes; efficiency of various roller covering materials at the drawing processes; elimination of roving processes by special methods of preparation; comparison of regular and long-draft spinning. Messrs. Grover, Hilton.

**Tex. 505, 506, 507. Textile Research.**

3-3-3

**Prerequisite:** Graduate standing.

A study of the moisture content of cotton yarns and fabrics; the convolutions in cotton fibres and their relation to spinning, weaving, and dyeing; the effect of mercerization on cotton yarns and fabrics; testing yarns and fabrics under variable conditions for breaking strength and elasticity.

Textile Staff.

**Tex. 531, 532, 533. Textile Design and Weaving.**

3-3-3

**Prerequisites:** Leno, Dobby and Jacquard Design, Tex. 441, 443, 445 or equivalent.

Study and practice in more advanced designing and analysis of fabrics, such as lenos made with twine and wire doups, lappits, and other fancy fabrics; designing for jacquard dress goods, table covers, reversibles, and other fabrics; making original designs for dobbay and jacquard fabrics; fabric costs; weaving fancy and jacquard fabrics.

Messrs. Nelson, Hart, Shinn.

**Tex. 535, 536, 537. Seminar.**

1-1-1

Discussion of scientific articles of interest to textile industry; review and discussion of student papers and research problems. Textile Staff.

**Tex. 571, 572, 573. Textile Dyeing.**

3-3-3

**Prerequisites:** C. & R. Dyeing I, Tex. 474 or equivalent.

The course consists of matching shades from standard and season color cards upon classes of materials which require skill in their dyeing, such as three-fibre, cotton-wool, and half-silk hosiery, woolens and worsteds with effect stripes, and cotton fabrics with woven figures or stripes of the different varieties of rayon; advanced work on chemical and microscopical examination of materials used in dyeing and finishing. Mr. Grimshaw.

**Tex. 575. Advanced Textile Microscopy.**

0-0-3

Prerequisites: Textile Microscopy, Tex. 489, 490.

Microscopic study of textile starches, fibres, fabrics, oils, etc.; study of mounting media for above; methods of mounting textile materials; methods of cross-sectioning textile materials; photomicrography. Mr. Grimshaw.

**ZOOLOGY****Courses for Undergraduates****Zool. 101. General Zoology.**

4-0-0

Required of freshmen in General Agriculture, Agricultural Education, Forestry, Wildlife Conservation, and of juniors in Agricultural Engineering.

Animals with special reference to the morphology and physiology of vertebrates. Messrs. Kulash, Mitchell, McCutcheon, Stevens, Wing.

**Zool. 102. Economic Zoology.**

0-4-0

Required of freshmen in Forestry and Wildlife Conservation; of sophomores in General Agriculture, Agricultural Education, and in Agricultural Chemistry; of juniors in Landscape Architecture.

Animals with special reference to the more important economic groups; designed to give the student a general knowledge of the animal kingdom.

Messrs. Kulash, Mitchell, Stevens.

**Zool. 111. Elementary Wildlife Management.**

1-0-0

Required of freshmen in Wildlife Conservation.

An introductory survey of the field of wildlife management.

Mr. Stevens.

**Courses for Advanced Undergraduates****Zool. 202. Animal Physiology.**

0-5-0 or 0-0-5

Prerequisites: Zool. 101, Phys. 115, Chem. 101, 102, and 103. Alternate for sophomores in General Agriculture, Agricultural Education and Agricultural Chemistry; required of juniors in Wildlife Conservation.

Comparative physiology of vertebrates, with particular reference to mammals and man. Detailed studies of various functions, with metabolism emphasized.

Mr. McCutcheon.

Zool. 213. Economic Entomology. 0-0-4

Prerequisite: Zool. 102.

Required of freshmen in Forestry; juniors in Wildlife Conservation, Landscape Architecture, Agricultural Education, Vegetable Gardening, Pomology, Plant Pathology and Floriculture.

The insects, including their economic importance and the principles of control. Messrs. Mitchell, Wing, Kulash.

\*Zool. 222, 223. Comparative Anatomy. 0-4-4

Prerequisites: Zool. 101, 102.

Required of sophomores in Wildlife Conservation; of juniors in Entomology.

Comparative morphology of vertebrates. Interrelations of organ systems studied for the various groups. Mr. Harkema.

Zool. 241, 243. Beekeeping. 3-0-3

Prerequisite: Zool. 102.

Required of seniors in Entomology.

Scientific beekeeping and honey marketing.

Mr. Stevens.

Zool. 251, 252, 253. Ornithology. 2-2-2

Prerequisites: Zool. 101, 102.

Required of sophomores in Wildlife Conservation.

Biology and morphology of North American birds.

Mr. Metcalf.

Zool. 302. Forest Entomology. 0-3-0

Prerequisite: Zool. 213.

Required of juniors in Forestry.

Forest insects, including the factors governing abundance, and the application of this knowledge in control. Mr. Kulash.

Zool. 312. Principles of Game Management. 0-3-0 or 0-0-3

Elective for juniors and seniors not in Game Management.

Brief survey of the field, study of the major principles involved, and the correlation of wildlife management with other land uses. Mr. Stevens.

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\* Not offered in 1945-46.

322 [ZOOLOGY]

Zool. 321, 322, 323. Wildlife Conservation.

3-3-3

Prerequisites: Zool. 251, 252, 253, F. C. 202, Bot. 101, 102, 203.

Required of juniors in Wildlife Conservation and Management.

History of game and wildlife management; relation of wildlife conservation to soil and forest conservation; national and state parks; general farming operations.

Mr. Stevens.

Zool. 332. Fur Resources.

0-3-0

Prerequisites: Zool. 321, 322, 323.

Elective for juniors and seniors in Wildlife Conservation.

Life history and management of the important fur-bearing animals; skinning, drying, marketing pelts; fur farming.

Mr. Stevens.

Courses for Graduates and Advanced Undergraduates

Zool. 401, 402, 403. Applied Entomology.

3-3-3

Prerequisites: Zool. 213.

Required of seniors in Entomology.

Crop and animal pests with emphasis on their identification; general principles of insect control and special study of contact insecticides, stomach poisons and fumigants; insecticide research methods.

Mr. Fulton.

Zool. 411. Genetics.

4-0-0

Prerequisite: Bot. 102 or Zool. 101.

Required of juniors in Animal Production, Entomology, Field Crops, Floriculture, Pomology, Poultry Science, and Vegetable Gardening; of seniors in Plant Pathology.

Basic principles of heredity and variation. Students conduct breeding experiments and study inheritance in various animals and plants.

Mr. Bostian.

Zool. 412. Advanced Genetics.

0-4-0

Prerequisite: Zool. 411.

Elective for juniors, seniors, and graduates.

Intended for students desiring more thorough and detailed training in fundamental genetics than provided by Zool. 411, with some attention to recent advances.

Mr. Bostian.

Zool. 413. Advanced Physiology.	0-0-3
Prerequisites: Zool. 101, 102, 202.	
Elective for juniors and seniors.	
Special studies in animal physiology with emphasis on fundamental processes involved. Lectures, reports, and conferences to promote an acquaintance with general literature and recent advances; selected exercises and demonstrations to develop experimental technique.	Mr. McCutcheon.
Zool. 421, 422, 423. Systematic Zoology.	3-3-3
Prerequisites: Zool. 101, 102.	
Required of juniors in Entomology.	
The classification of insects or other groups of animals.	
	Messrs. Metcalf, Mitchell.
Zool. 433. Field Zoology.	0-0-4
Prerequisites: Zool. 101 and 213, or 222, 223.	
Required of juniors in Wildlife Conservation and seniors in Entomology.	
The relation between animals and their environment. Frequent excursions to the field will be taken.	Messrs. Bostian, Wing.
*Zool. 441, 442, 443. Microtechnic and Histology.	3-3-3
Prerequisites: Zool. 101, 102, 202, 222, 223.	
Required of seniors in Entomology.	
Animal tissues and their preparation.	Mr. Harkema.
Zool. 451, 452, 453. Wildlife Management.	3-3-3
Prerequisites: Zool. 321, 322, 323.	
Required of seniors in Wildlife Conservation.	
Foods and feeding habits of the more important groups of wild animals; field and laboratory studies of wildlife management and research; the economic relations of game, predatory, and fur-bearing animals.	
	Mr. Stevens.
Zool. 461. Vertebrate Embryology.	5-0-0
Prerequisites: Zool. 101, 102.	
Required of juniors in Poultry Science, and seniors in Entomology.	
The comparative embryology of the principal groups of vertebrates, with special emphasis on the chick.	Mr. Harkema.

\* Will not be given in 1945-46.

Zool. 462, 463. Advanced Animal Ecology.	0-3-3
Prerequisite: Zool. 433.	
Required of seniors in Wildlife Conservation.	
Animal geography and the factors which influence the distribution of animals.	Mr. Metcalf.
Zool. 471, 472, 473. Advanced Wildlife Management.	3-3-3
Prerequisite: Concurrently with or preceded by Zool. 321, 322, 323.	
Elective for seniors in Wildlife Conservation.	
An assigned problem to be planned and worked out by the student. A term paper covering the procedure.	Mr. Stevens.
Zool. 481, 482, 483. Advanced Food Habits Problems.	3-3-3
Prerequisite: Concurrently with or preceded by Zool. 451, 452, 453.	
Elective for seniors in Wildlife Conservation.	
Assigned or selected problem dealing with the foods and feeding habits of one species of wild animal or a group of similar wild animals.	
	Mr. Stevens.
*Zool. 492, 493. Parasitology.	0-3-3
Prerequisite: Zool. 101, 102, 222, 223.	
Required of seniors in Wildlife Conservation.	
Structures, life-cycles, pathogenicity and control of animal parasites.	
	Mr. Harkema.
Courses for Graduates Only	
Zool. 501, 502, 503. Systematic Entomology.	3-3-3
Prerequisite: Zool. 421, 422, 423.	
Codes of nomenclature, methods of writing descriptions, constructing keys, determining priority, selecting and preserving types, and making bibliographies and indexes.	Messrs. Metcalf, Mitchell.
Zool. 511, 512, 513, and Zool. 551, 552, 553. Research in Zoology.	3-3-3
Prerequisite: eighteen term credits in Zoology.	
Problems in development, life history, morphology, physiology, ecology, genetics, game management, taxonomy, or parasitology.	
Messrs. Metcalf, Mitchell, Bostian, McCutcheon, Harkema, Stevens.	

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\* Will not be given in 1945-46.

**Zool. 521, 522, 523. Seminar.**

1-1-1

Prerequisite: eighteen term credits in Zoology.

Mr. Metcalf.

**Zool. 531, 532. Biological Control of Insects.**

3-0-0

Diseases, predators and parasites of insects; methods of rearing and disseminating for biological control.

Messrs. Fulton, Smith.

**Zool. 533. Advanced Genetics.**

0-0-3

Prerequisite: Zool. 411, 412.

Special topics and recent advances, accomplished by lectures, references, conferences, and reports by students, each selecting one or more topics for special study.

Mr. Bostian.

**Zool. 541, 542. Insect Physiology.**

3-3-0

Prerequisite: Zool. 202.

Mechanisms involved in the life processes of insects. Mr. McCutcheon.

**Zool. 543. Fruit Insects.**

0-0-3

Prerequisite: Zool. 213 or equivalent.

The economic importance of insects attacking fruit or fruit trees; their characteristics, habits, ecology, and biology; with most practical control measures.

Mr. Smith.

**Zool. 551, 552, 553. Research in Zoology.**

3-3-3

See Zool. 511, 512, 513.

Staff.

**Zool. 561, 562, 563. Insect Biology.**

3-3-3

Life histories, including modes of reproduction, embryology, growth, metamorphosis, protection, food relations, hibernation, social relations, and adaptations.

Mr. Mitchell.

Zool. 571, 572, 573. Insect Ecology and Behavior.

3-3-3

Natural activities of insects: feeding, protection, reproduction, reaction  
to environmental factors, interrelations, and distribution.

Mr. Fulton.

Zool. 581, 582, 583. Insect Morphology.

3-3-3

The external and internal anatomy of insects and their near relatives.

Mr. Metcalf.

Zool. 591. Immature Insects.

0-3-0

Prerequisite: Zool. 102 and 213 or equivalent.

Methods of collecting, preserving and determining immature insects.

Mr. Smith.

## V. SUMMARY OF ENROLLMENT

1944-45\*

### 1. Resident Students

#### A. Candidates for Degrees

1. Freshmen .....	614
2. Sophomores .....	141
3. Juniors .....	47
4. Seniors .....	45
5. Graduates .....	46
 Total .....	 893

#### B. Irregular Students

†1. Extension Classes in Raleigh and Cary.....	100
2. Special Students and Auditors .....	5
3. Pratt and Whitney Fellows .....	9

Total .....	114	1,007
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#### †2. Nonresident Students

A. Correspondence Students for College Credit.....	379
B. Correspondence Students in Practical Courses, no credit .....	28

Total .....	407	1,414
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#### 3. Summer School Students, 1944

A. Regular Students (twelve weeks term).....	258
B. Pratt & Whitney Fellows .....	9
C. Special Students and Auditors .....	4

Total .....	271	1,685
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#### 4. Short Courses and Special Conferences

1. Engineering, Science and Management War Training Courses .....	1,480
2. Vocational Training for War Production Workers .....	321
3. Institute for Surveyors .....	53
4. Waterworks School .....	41
5. Mid-Southeastern Gas Association .....	100

Total .....	1,995
Grand Total .....	3,680

\* Does not include Spring Term, 1944-45.

† Data from January 1, 1944, to January 1, 1945.

## ENROLLMENT BY CURRICULA

Basic Division		Division of Teacher Education	
(Freshmen and Sophomores)		(Juniors, Seniors, Graduates)	
Agriculture .....	105	Agricultural Education .....	1
Engineering .....	528	Industrial Arts Education .....	1
Teacher Education .....	39	Occup. Inf. and Guidance.....	6
Textiles .....	83		
Total .....	755	Total .....	8
 School of Agriculture and Forestry			
(Juniors, Seniors, Graduates)			
Agricultural Options .....	37	Textile Chemistry and Dyeing .....	3
Agricultural Chemistry .....	13	Textile Management .....	5
Forestry .....	1	Textile Manufacturing .....	8
Total .....	51	Total .....	23
 School of Engineering			
(Juniors, Seniors, Graduates)			
Aeronautical .....	9	Nonclassified Auditors and Special Students .....	5
Architectural .....	1	Pratt and Whitney Fellows .....	9
Architecture .....	1		
Chemical .....	12	* * * * *	
Civil .....	8	Distribution of Graduate students by schools (included in above de- partmental classifications).	
Electrical .....	3	Agriculture .....	37
General .....	3	Engineering .....	3
Geological .....	1	Teacher Education .....	4
Industrial .....	2	Textiles .....	2
Mechanical .....	16		
Total .....	56	Total .....	46

# FIFTY-FIFTH ANNUAL COMMENCEMENT

MAY 29, 1944

## DEGREES CONFERRED SCHOOL OF AGRICULTURE AND FORESTRY

### BACHELOR OF SCIENCE IN AGRICULTURAL CHEMISTRY

Henry Frederick Grady ..... Seven Springs

### IN AGRONOMY (FIELD CROPS)

*Douglas Scales Chambee .....	Zebulon
James Arthur Grose, Jr. ....	Forest City
Joseph Linward Perry .....	Cofield
Herbert Norris Robertson .....	Knightdale
Robert Boyd Robinson, Jr. ....	Littleton

### IN ANIMAL PRODUCTION

Bruce Bernard Blackmon ..... Buies Creek

### IN FARM MARKETING AND FARM FINANCE

Eustace Ovid Coor, Jr. ..... Selma

### IN FLORICULTURE

Alpheus Myron Pratt ..... Draper

### IN FORESTRY

Morris Green .....	New York, N. Y.
Harold Woodrow Hinshaw .....	Winston-Salem
*Robert Allan Holcombe .....	Teaneck, N. J.

### IN POULTRY SCIENCE

Benjamin Earl Britt ..... Garner

### IN VEGETABLE GARDENING

Ervin Trowbridge Bullard ..... Central Valley, N. Y.

### IN WILDLIFE CONSERVATION AND MANAGEMENT

William Madison Lewis .....	Faison
Charles Scott Sullivan .....	Asheville

\* With Honors.

## SCHOOL OF ENGINEERING

## BACHELOR OF AERONAUTICAL ENGINEERING

Edward Andrew Adams .....	Raleigh
Roderick McIver Allen, Jr. ....	Raleigh
William Whitehead Avera .....	Rocky Mount
*Joshua Reese Bailey .....	Rocky Mount
*Joseph Williams Bazemore .....	Mount Olive
Kenneth Wayland Goodson .....	Salisbury
**Benjamin Wayne Greene .....	Elizabethtown
Henry Joseph Jaworski .....	Rochester, N. Y.
George Nevitt Jones, Jr. ....	Raleigh
Charles Haywood McLemore .....	Godwin
Charles John Paulus, III .....	Yeadon, Pa.
Samuel Gordon West, Jr. ....	Greensboro

## BACHELOR OF ARCHITECTURAL ENGINEERING

Robert Anderson Atkinson, Jr. ....	Winston-Salem
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## BACHELOR OF CERAMIC ENGINEERING

Emory Huston Creasman, Jr. ....	Swannanoa
Augusto Lopez Sevilla .....	Manila, Philippines
Edward Lester Woodall, Jr. ....	Smithfield

## BACHELOR OF CHEMICAL ENGINEERING

William Wilton Barnhardt .....	Winston-Salem
**John Knox Beasley .....	Louisburg
Raul Carvalho .....	Swannanoa
Harvey Darrell Davis .....	Marshallberg
Albert Edgar Gibson, Jr. ....	Greenville
William Jackson Goodrum .....	Greenville
Fred Edward Gorter .....	Enka
Hartwell Lamar Graham, Jr. ....	Goldsboro
John Lovell Hall .....	Cary
William John Hecht, Jr. ....	Norlina
Henry Russell Jobe .....	Burlington
Joseph Henry Jones, Jr. ....	Jersey City, N. J.
Brian Franklin Lewis .....	Hickory
William Marcellino .....	New Bedford, Mass.
Stanley Hancock Patten .....	Louisburg
Buford Wright Penland .....	Asheville
Thomas Bernard Pratt, Jr. ....	Winston-Salem
John Nicholson Rennie .....	Whitakers

\* With Honors.

\*\* With High Honors.

**Beverly Leak Rose .....	Wadesboro
James Wilson Setzer .....	Maiden
Abner Thomas Stewart .....	Washington
*Harold Lee Trentham .....	Mars Hill
*Samuel Clyde Vaughn, Jr. ....	Charlotte
Robert Edward Weaver .....	Asheville

**BACHELOR OF CIVIL ENGINEERING**

Floyd Powell Barnes .....	Henderson
James Aloysius Heffernan .....	New York, N. Y.
Frederick Byron Hendricks, Jr. ....	Charlotte
James Brantley Lambeth .....	High Point

**BACHELOR OF CIVIL ENGINEERING,  
SANITARY OPTION**

James Fredrick Kelly .....	Rowland
----------------------------	---------

**BACHELOR OF ELECTRICAL ENGINEERING**

Theodore Bloom .....	Bridgeport, Conn.
Everett Litchfield Carty .....	Durham
William Thomas Dickinson .....	Wilson
Archibald Bernard Goodson .....	Mount Olive
Charles Query Lemmond .....	Monroe
*Linwood Dawson Lewis .....	Macclesfield
Walter Asbury Miller .....	Concord
Charles Wyche Parker .....	Salisbury
L. E. Paysour, Jr. ....	Mooresville
George Richard Steele .....	Charlotte
William Dawes Van Arsdale .....	East Orange, N. J.

**BACHELOR OF SCIENCE IN GENERAL ENGINEERING**

**Edwin Dexter Cox .....	Charlotte
Paul Felix Hilton .....	New York, N. Y.
Archie Knight Robertson, Jr. ....	Goldsboro
Henry Jerome Stockard, Jr. ....	Raleigh

**BACHELOR OF INDUSTRIAL ENGINEERING**

William Donaldson Barksdale .....	Bluefield, W. Va.
Edward Peter Breuer .....	Greensboro
George Thomas Dixon .....	Elm City
Jesse Wyatt Ethridge .....	Goldsboro
William Blanton Noyes .....	Marion

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\* With Honors.

\*\* With High Honors.

**BACHELOR OF MECHANICAL ENGINEERING**

William Royce Allen .....	Badin
Charles Burgess Brame .....	Lucama
*Eugene Leroy Briggs, Jr. ....	High Point
Thomas Leech Briggs, Jr. ....	Raleigh
Leo Turrell Brinson, Jr. ....	Arapahoe
**Ray Lentz Lyerly .....	Thomasville
William McCormick Neale, Jr. ....	Greensboro
*John Mann Simmons .....	Greensboro
Jack Louis Singer .....	New York, N. Y.
*Charles Henry Steele .....	Charlotte
*Richard Miller Weatherly .....	Greensboro
Carlyle Aubrey Wiggins, Jr. ....	Kinston

**DIVISION OF TEACHER EDUCATION****BACHELOR OF SCIENCE****IN AGRICULTURAL EDUCATION**

James Aubrey Duncan .....	Trinity
Otto Robert Hecht .....	Norlina
William Patton Allen Jobe .....	Rutherfordton
Terrell Amley Jones .....	Polkton
Arnold Warren Lingle .....	Salisbury
**William Arthur Nesbitt .....	Etowah
***Horace A. Silver .....	Raleigh
George Milton Thomas, Jr. ....	Cameron
Sam Arthur Tuten, Jr. ....	Edward

**IN OCCUPATIONAL INFORMATION AND GUIDANCE**

**Margaret Krider Fleming .....	Raleigh
---------------------------------	---------

**SCHOOL OF TEXTILES****BACHELOR OF SCIENCE****IN TEXTILE CHEMISTRY AND DYEING**

Arthur Louis Fried .....	New York, N. Y.
--------------------------	-----------------

**IN TEXTILE MANAGEMENT**

James Alvin Allen .....	Raleigh
-------------------------	---------

**IN TEXTILE MANUFACTURING**

Robert Renfrow Doak .....	Raleigh
John Douglas Ferguson .....	West Englewood, N. J.
Charles Urquhart Hill, Jr. ....	Charlotte
Donald Franklin Sapp .....	Concord

\* With Honors.

\*\* With High Honors.

\*\*\* As of June 11, 1934.

## IN WEAVING AND DESIGNING

*Mary Elizabeth Goforth .....	Charlotte
Mary Laura McArthur .....	Lumberton
Rebecca Emily Joyce Shelden .....	Camp Forest, Tenn.

## ADVANCED DEGREES

## MASTER OF AGRICULTURAL EDUCATION

Ernest Franklin Hubbard .....	Mamers
-------------------------------	--------

## MASTER OF SCIENCE

## IN AGRICULTURAL ECONOMICS

Francis Edward McVay .....	Peace Dale, R. I.
Harry Alton White .....	Raleigh

## IN ANIMAL PRODUCTION

David Wiggs Harris .....	Newell
--------------------------	--------

## IN PLANT PATHOLOGY

Albert William Feldman .....	Chicago, Ill.
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## HONORARY DEGREES

1944

## DOCTOR OF TEXTILE SCIENCE

David Clark .....	Charlotte
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## DOCTOR OF ENGINEERING

Louis Valvelle Sutton .....	Raleigh
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1943

## DOCTOR OF TEXTILE SCIENCE

Wilbert James Carter .....	Greensboro
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## DOCTOR OF SCIENCE

Benjamin Wesley Kilgore .....	Raleigh
-------------------------------	---------

## DOCTOR OF ENGINEERING

Thomas Alfred Morgan .....	New York
----------------------------	----------

\* With Honors.

## MEDALS AND PRIZES

## SCHOLARSHIP DAY AND COMMENCEMENT, 1944

GAMMA SIGMA EPSILON SCHOLARSHIP CUP  
(Chemistry)

Edgar Riley Cole, Junior in Chemical Engineering,  
Phoebus, Va.

## AMERICAN INSTITUTE OF CHEMICAL ENGINEERS' AWARD

Edgar Riley Cole, Junior in Chemical Engineering,  
Phoebus, Va.

J. C. STEELE SCHOLARSHIP CUP  
(Upperclassman Ceramic Award)

Richard Dammann, Senior in Ceramic Engineering,  
Amityville, N. Y.

MOLAND-DRYSDALE SCHOLARSHIP CUP  
(Freshman Ceramic Award)

Clarence Rogers Westlake, Freshman in Ceramic Engineering,  
Raleigh, N. C.

## NATIONAL ASSOCIATION OF COTTON MANUFACTURERS' MEDAL

Donald Franklin Sapp, Senior in Textile Manufacturing,  
Concord, N. C.

PHI KAPPA PHI MEDALS AND PRIZES  
(Senior Award)

Benjamin Wayne Greene, Senior in Aeronautical Engineering,  
Elizabethtown, N. C.

## (Junior Award)

Edgar Riley Cole, Junior in Chemical Engineering,  
Phoebus, Va.

## (Sophomore Award)

Joe Floyd Briggs, Sophomore in Architecture,  
Lexington, N. C.

XI SIGMA PI AWARD  
(Forestry)

Robert Allan Holcombe, Senior in Forestry,  
Teaneck, N. J.

## FORENSIC AWARD

(National Individual Ranking in Direct Clash Debating)  
Newton W. Mandel, Freshman in Textiles,  
New York, N. Y.

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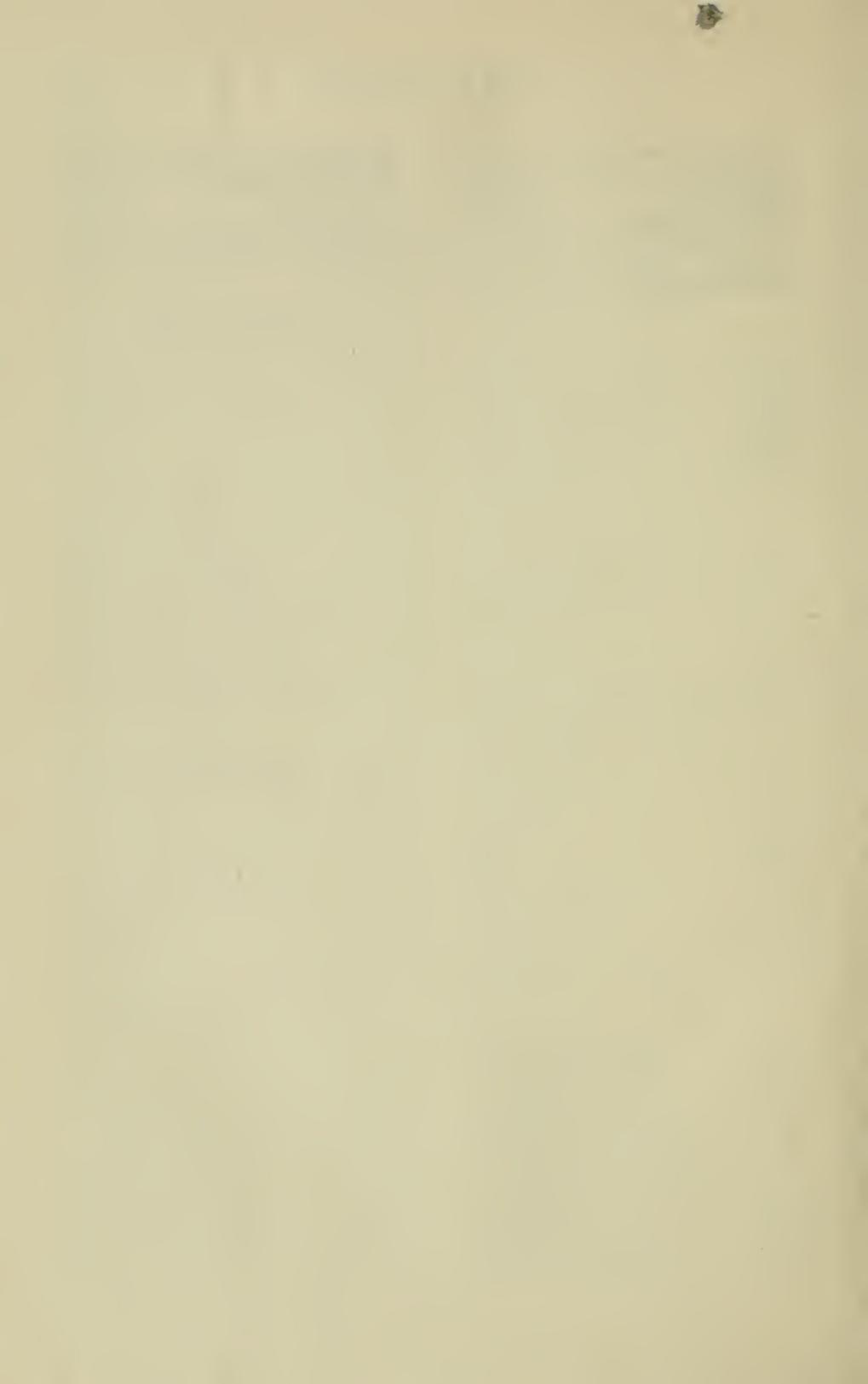
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# DIRECTORY

## FACULTY, STAFF, and STUDENTS

OF

NORTH CAROLINA STATE COLLEGE OF

AGRICULTURE AND ENGINEERING

OF THE

UNIVERSITY OF NORTH CAROLINA



**1944-1945**

State College Station

Raleigh



# OFFICERS OF ADMINISTRATION

FOR THE ACADEMIC YEAR 1944-45

## THE CONSOLIDATED UNIVERSITY

President of the Greater University .....	Frank Porter Graham
Controller .....	W. D. Carmichael, Jr.

### N. C. STATE COLLEGE

Dean of Administration .....	Colonel J. W. Harrelson
Dean of Students .....	E. L. Cloyd
Director of Registration .....	W. L. Mayer
Assistant Controller & Business Manager .....	J. G. Vann

### FACULTY COUNCIL

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L. D. Bauer .....	Associate Dean, School of Agriculture and Forestry; Director, Agricultural Experiment Station
B. F. Brown .....	Dean, Basic Division of the College
T. E. Browne .....	Director, Division of Teacher Training
Wm. Hand Browne, Jr. ....	Head, Department of Electrical Engineering
Malcolm E. Campbell .....	Dean, School of Textiles
E. L. Cloyd, Secretary .....	Dean of Students
W. L. Mayer .....	Director of Registration and Purchasing Agent
Z. P. Metcalf .....	Associate Dean, Graduate School; Head, Department of Zoology and Entomology
I. O. Schaub .....	Dean, School of Agriculture and Forestry; Director, Agricultural Extension Service
J. G. Vann .....	Assistant Controller & Business Manager
L. L. Vaughan .....	Acting Dean, School of Engineering
A. J. Wilson .....	Head, Department of Chemistry

### OTHER OFFICERS

Alumni Secretary .....	H. W. Taylor
Architects: Landscape College .....	J. P. Pillsbury
Athletics: Director Business Manager .....	Ross Shumaker
Dining Hall, Steward .....	J. F. Miller
Dormitories: Superintendent Chief Assistant .....	J. L. Von Glahn
Engineer, College .....	T. M. Hamby
College Extension, Director .....	T. T. Wellons
Gymnasium, Custodian .....	James E. Hobbs
Laundry, Superintendent .....	L. L. Vaughan
Librarian, Acting .....	Edward W. Ruggles
Military, P. M. S. & T. .....	Ervin M. Johnson
Music, Director .....	W. L. Godwin
Nurse, Head .....	Mrs. Reba Davis Clevenger
Physician .....	Col. Douglass N. McMillin
Power Plant, Superintendent .....	Major C. D. Kutschinski
College Publicity, Director .....	Major C. D. Kutschinski
Self-Help, Director .....	Miss I. Trollinger
Service Department, Manager .....	A. C. Campbell, M.D.
Station Farms, Director .....	A. A. Riddle
Y.M.C.A., General Secretary .....	Rudolph Pate
	Mrs. L. W. Bishop
	W. F. Morris
	F. E. Miller
	Edward S. King



## STANDING COMMITTEES

FOR THE SCHOOL YEAR 1944-45

### ATHLETICS:

H. A. Fisher, Chairman  
A. J. Wilson, Secretary  
J. W. Patton  
I. O. Schaub  
J. L. Stuckey

W. F. Morris

C. G. Mumford

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M. E. Gardner, Chairman  
J. P. Pillsbury, Secretary  
C. H. Bostian  
J. K. Coggan  
L. E. Cook  
R. L. Cummings  
T. R. Hart  
W. N. Hicks  
W. H. Hoffman  
C. L. Mann  
J. F. Miller  
W. F. Morris  
W. E. Shinn  
Ross Shumaker  
J. G. Vann

### HISTORY:

J. W. Patton, Chairman  
J. K. Coggan  
A. M. Fountain  
F. M. Haig  
T. R. Hart  
C. L. Mann  
H. W. Taylor  
H. H. Vestal

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Z. P. Metcalf, Chairman  
L. D. Baver  
B. F. Brown  
T. E. Browne  
Malcolm E. Campbell  
H. A. Fisher  
E. G. Hoefer  
I. O. Schaub  
L. L. Vaughan

### COLLEGE EXTENSION:

H. B. Briggs, Chairman  
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Colhard, C. M.	So., Tex.	12 Horne St.		Elkin, N. C.
Collins, I. K.	Sr., Ae. E.	18 Horne St.		Forest City, N. C.
Collins, J. C.	Fr., Ag.	302 Wat., 3038		Francisco, N. C.
Collins, M. C.	Fr., Ag. Ed.	217 Wat., 3035		Louisburg, N. C.
Conley, Mabel C. (Miss)	Aud.	15 Enterprise St.		Raleigh, N. C.
Conner, G. C., Jr.	Fr., Arch. E.	233 Bagwell, 3365		High Point, N. C.
Conway, E. R., III	So., Ch. E.	309 Bagwell, 3375		Greenville, N. C.
Cook, E. R.	Fr., M. E.	107 Welch, 3243		Kannapolis, N. C.
Cook, H. L.	Fr., M. E.	6 Berry, 4339		Clemmons, N. C.
Cooper, Mary F. (Miss)	Gr., Ag. Ch. R.F.D. 4			Raleigh, N. C.
Corey, J. L., Jr.	Fr., Ag.	119 Bagwell, 3319		Robersonville, N. C.
Corriher, T. F.	Fr., M. E.	308 Wat., 3044		Lincolnton, N. C.
Cortina, E. D.	Fr., Tex.	106 4th, 3116		Mexico City, Mex.
Cowart, J. C.	Fr., C. E.	124 Bagwell, 3324		Newport, N. C.
Cox, C. H.	Fr., Ae. E.	Withdrew		Jonesboro, N. C.
Cox, Gladys E. (Miss)	Jr., Occ. I. & G.	220 N. East St.		Raleigh, N. C.
Craver, J. A.	Fr., Ag.	329 Bagwell, 3395		Lexington, N. C.
Crawford, J. R., Jr.	Fr., Occ. I. & G.	Fieldhouse		Wilmington, N. C.
Creagh, A. H.	Fr., E. E.	104 4th, 3114		Pollocksville, N. C.
Crigler, B. R.	Fr., M. E.	116 Wat., 3016		Atlanta, Ga.
Critz, W. E.	Fr., Tex.	207 Welch, 3255		Kannapolis, N. C.
Croker, G. R.	Fr., E. E.	Fieldhouse		Wilkinsburg, Pa.

## STUDENT DIRECTORY

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Name	Classification	School Address Dorm. Box No. or St. No.	Home Address
Crowell, F. P.	Fr., E. E.	109 Gold, 3209	Newell, N. C.
Culbreth, C. F.	Fr., Ch. E.	120 Bagwell, 3320	Rutherfordton, N. C.
Culp, J. M., Jr.	Sr., Tex. C. & D.	1720 Hillsboro St.	Charlotte, N. C.
Daniel, W. J.	So., Ch. E.	2407 Clark Ave.	Henderson, N. C.
Daniels, C. R.	Fr., Arch. E.	305 Welch, 3265	Randleman, N. C.
Daughety, J. C.	Fr., M. E.	210 Welch, 3258	Portsmouth, Va.
Daughtridge, J. C.	So., Ag. E.	132 Bagwell, 3332	Rocky Mount, N. C.
David, C. S., Jr.	Fr., M. E.	108 Gold, 3208	Asheville, N. C.
Davis, A. C.	Fr., C. E.	308 Gold, 3232	Charlotte, N. C.
Davis, B. H.	So., Ae. E.	7 Berry, 4340	Shelby, N. C.
Davis, J. A., Jr.	Fr., Tex.	202 Gold, 3214	Carthage, N. C.
Davis, J. H., Jr.	Fr., E. E.	206 Bagwell, 3338	Newport, N. C.
Davis, Richard Joe	Fr., M. E.	1123 Harvey St.	Raleigh, N. C.
Davis, Robert James	Fr., Ag.	103 Welch, 3239	Durham, N. C.
Dawson, C. G.	Sr., F. B. Adm.	2209½ Hope St.	Dunn, N. C.
Dayvault, J. O., Jr.	Fr., M. E.	207 Welch, 3255	Kannapolis, N. C.
Dean, E. W.	Fr., Ag. E.	214 Wat., 3032	Louisburg, N. C.
Dean, T. A.	Fr., C. E.	214 Wat., 3032	Louisburg, N. C.
Deas, J. E., Jr.	Jr., Ch. E.	211 Bagwell, 3343	Canton, N. C.
Denning, N. C.	Fr., Ag.	101 Wat., 3001	Four Oaks, N. C.
Diamond, Harvey	Jr., Tex.	109 Oberlin Rd.	New York, N. Y.
Dillingham, K. D.	Fr., Ae. E.	307 Bagwell, 3373	Weaverville, N. C.
Dillon, C. A., Jr.	Jr., M. E.	1603 Hillsboro St.	Raleigh, N. C.
Dissel, J. G.	Fr., Cer. E.	105 Gold, 3205	New Bern, N. C.
Dixon, C. D.	So., E. E.	105 Wat., 3005	Belmont, N. C.
Dixon, C. W.	So., Ae. E.	210 Wat., 3028	Elm City, N. C.
Dixon, D. B.	Fr., Ag. Ed.	106 Berry, 4306	Mebane, N. C.
Dobbins, W. J.	Fr., M. E.	304 Welch, 3264	Boonville, N. C.
Dowdy, J. O.	Fr., Ch. E.	208 Gold, 3220	Sanford, N. C.
Dull, T. E.	Fr., Ag.	2212 Hope St.	Cana, N. C.
Easom, Lillie O. (Miss)	Gr., Ag. Ch.	118 N. Wilmington St.	Selma, N. C.
Eason, J. D., Jr.	Fr., Ae. E.	111 Wat., 3011	Goldsboro, N. C.
Eason, R. H.	Fr., Ch. E.	113 Wat., 3013	Gatesville, N. C.
Edge, J. L.	Fr., Ag.	10 Berry, 4343	Fayetteville, N. C.
Edgerton, W. L., Jr.	So., Ag. Ed.	106 Welch, 3242	Union Mills, N. C.
Edwards, L. M., Jr.	Fr., I. Arts Ed.	Fieldhouse	Big Stone Gap, Va.
Edwards, M. R.	Fr., Ae. E.	301 Wat., 3037	Princeton, N. C.
Eicholtz, A. J.	Fr., Ch. E.	Fieldhouse	Duquesne, Pa.
Ellington, Mary Oliver (Miss)	Gr. Entom.	303 New Bern Ave.	Raleigh, N. C.
Elmore, W. F.	Sr., F. B. Adm.	2209½ Hope St.	Dunn, N. C.
English, W. A.	Fr., Tex.	106 Gold, 3206	Waxhaw, N. C.
English, W. C., Jr.	Fr., Ae. E.	318 Wat., 3054	Winston-Salem, N. C.
Ernest, L. M., Jr.	Fr., Arch. E.	1720 Hillsboro St.	Greenville, N. C.
Etheredge, R. W., Jr.	So., Ae. E.	Withdrew	Spring Hill, N. C.
Eudy, B. L.	Fr., Tex.	206 Gold, 3218	Albemarle, N. C.
Evans, J. D.	Fr., E. E.	230 E. Morgan St.	Kenly, N. C.
Evans, J. T.	Fr., M. E.	206 Welch, 3254	Sylva, N. C.
Evans, W. J., Jr.	Fr., M. E.	Withdrew	Burlington, N. C.
Exum, C. R.	Fr., M. E.	209 Gold, 3221	Fremont, N. C.
Ezzell, P. M., Jr.	Fr., Ch. E.	202 4th, 3120	Oxford, N. C.
Farrell, R. D.	Fr., Tex.	211 Welch, 3259	Gastonia, N. C.
Ferrell, P. O.	Fr., Ag.	327 Bagwell, 3393	Durham, N. C.
Fields, J. L.	Fr., C. E.	112 Welch, 3248	Siler City, N. C.
Finney, R. C.	Fr., Tex.	326 Bagwell, 3392	Salisbury, N. C.
Fisler, C. A.	Jr., M. E.	114 Bagwell, 3314	Ivanhoe, N. C.
Fitzgerald, W. C., Jr.	Fr., C. E.	104 Bagwell, 3304	Raleigh, N. C.

## NORTH CAROLINA STATE COLLEGE

Name	Classification	School Address Dorm. Box No. or St. No.	Home Address
Flannagan, S. G.	Fr., Ae. E.	102 4th, 3112	Henderson, N. C.
Fleming, E. P.	Fr., E. E.	131 Bagwell, 3331	Gritton, N. C.
Fleming, Margaret K.	Gr., Exp. Stat.	C-301 Boylan Apts.	Raleigh, N. C.
Floyd, B. P.	Fr., I. E.	313 Bagwell, 3379	Trenton, N. J.
Fogelman, R. L., Jr.	Fr., Civ. E.	219 Bagwell, 3351	Greensboro, N. C.
Francis, J. G.	Sr., Pom.	108 Wat., 3008	Waynesville, N. C.
Francis, M. C., Jr.	Fr., Tex.	305 Wat., 3041	Shelby, N. C.
Frazelle, G. C.	Fr., Chem. E.	305 4th, 3131	Richlands, N. C.
Frazier, E. D.	Jr., M. E.	2513 Clark Ave.	High Point, N. C.
Frazier, Elizabeth J.	Jr., Tex. W. & D.	232 Glascock St.	Wake Forest, N. C.
Freeman, D. G.	Fr., Chem. E.	210 Gold, 3222	Greensboro, N. C.
Freeman, Jeanne (Miss)	Gr., Exp. Stat.	2406 Stafford Ave.	Providence, R. I.
Freeman, June L. (Miss)	Pratt & W.	112 N. Wilmington St.	Raleigh, N. C.
Freeman, Robertson, Jr.	Fr., Agri.	318 Wat., 3054	Winston-Salem, N. C.
Freeman, W. F., Jr.	So., Arch. E.	2513 Clark Ave.	High Point, N. C.
Freshwater, W. R., Jr.	Fr., E. E.	317 Wat., 3053	Burlington, N. C.
Fuchs, David	So., Tex.	101 Berry, 4301	Kinston, N. C.
Fugate, P. T., Jr.	Jun., Mech. E.	10 Enterprise St.	Elm City, N. C.
Fulcher, T. H., Jr.	Fr., E. E.	Infirmary	Leaksville, N. C.
Fuller, G. C.	Jr., Che. E.	312 Bagwell, 3378	Gastonia, N. C.
Fuller, R. E., Jr.	Fr., Civ. E.	104 Bagwell, 3304	Raleigh, N. C.
Furbee, G. W.	So., Ag. E.	118 Wat., 3018	Wenona, N. C.
Furgurson, G. H., Jr.	Fr., E. E.	212 Welch, 3260	Durham, N. C.
Gaeta, A. J.	So., Tex.	6 Fieldhouse	Staten Island, N. Y.
Gale, E. M.	Fr., Tex.	217 Bagwell, 3349	New York, N. Y.
Gant, R. B.	Fr., Tex.	2412 Hillsboro St.	Burlington, N. C.
Gardner, C. E.	Fr., Ag.	2708 Bedford Ave.	Raleigh, N. C.
Gatlin, L. W.	Jr., Gen. E.	107 Berry, 4307	Charlotte, N. C.
Geddes, R. B.	Fr., For.	114 Bagwell, 3314	Falls Church, Va.
Geer, P. H.	Fr., Ae. E.	230 Bagwell, 3362	Morehead City, N. C.
Geluso, F. R.	Sen., Civ. E.	Withdrew	Brooklyn, N. Y.
Gerrard, C. D.	Fr., For.	332 Bagwell, 3398	Charlotte, N. C.
Geylan, H. M.	So., Tex.	1715 Park Drive	Istanbul, Turkey
Gibbs, Eleanor (Miss)	Gr., Ag. Chem.	F-102 Boylan Apts.	Raleigh, N. C.
Gibson, P. E.	Fr., Occ. I. & G.	Fieldhouse	Winston-Salem, N. C.
Gibson, R. M.	Fr., M. E.	3 Berry, 4336	Laurel Hill, N. C.
Gilbert, C. R.	Sr., Tex. Mgt.	109 Oberlin Road	Boston, Mass.
Gilbert, D. S.	Fr., Ch. E.	334 Bagwell, 3400	Winston-Salem, N. C.
Gilbert, J. H.	Fr., Gen. E.	101 Bagwell, 3301	Catawba, N. C.
Gilmore, G. G., Jr.	Fr., Ag.	701 Brooks Ave.	Julian, N. C.
Gilmore, R. S.	Fr., Ae. E.	216 Forest Rd.	Hillsboro, N. C.
Glaser, Melvin	Fr., Tex.	321 Bagwell, 3387	Bronx, N. Y.
Godfrey, M. R.	Fr., Ag.	1 Berry, 4334	Elizabeth City, N. C.
Godwin, S. B.	Fr., E. E.	103 Wat., 3003	Four Oaks, N. C.
Goggans, Sarah (Miss)	Jr., Occ. I. & G.	705 W. Morgan St.	Raleigh, N. C.
Goldinger, H. J.	Jr., W. & D.	312 Pogue St.	Los Angeles, Calif.
Gouge, W. L., Jr.	Fr., M. E.	222 Bagwell, 3354	Asheville, N. C.
Graham, T. M.	Fr., Ag.	Fieldhouse	Tarboro, N. C.
Grant, E. C.	Fr., E. E.	109 Wat., 3009	Windsor, N. C.
Grantham, C. H., Jr.	Fr., Arch. E.	224 Bagwell, 3356	Greensboro, N. C.
Gray, G. A.	Fr., Arch. E.	231 Bagwell, 3363	High Point, N. C.
Grayson, F. N.	Fr., Ae. E.	118 Wat., 3018	Spindale, N. C.
Green, S. L.	Fr., Ae. E.	102 4th, 3112	Henderson, N. C.
Greene, C. B.	Fr., Ae. E.	311 Gold, 3235	Crossnore, N. C.
Greene, G. R.	So., Ae. E.	117 Wat., 3017	Hendersonville, N. C.
Greene, J. E.	So., Tex.	17 Enterprise St.	Jamaica, N. Y.
Greeson, H. K.	Fr., E. E.	107 Bagwell, 3307	Greensboro, N. C.
Gresham, A. R., Jr.	Fr., Gen. E.	210 Bagwell, 3342	Mooresville, N. C.
Gresham, S. C.	Fr., Ae. E.	304 Gold, 3228	Star, N. C.

## STUDENT DIRECTORY

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Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
Griffin, C. A.	Jr., An. Prod.	415 Calvin Rd.		Raleigh, N. C.
Griggs, Cleo C. (Miss)	Gr., Occ. I. & G.	301 N. Blount St.		Raleigh, N. C.
Grigsby, C. E.	So., Ae. E.	105 Wat., 3005		Hilton Village, Va.
Grimstead, A. F.	Fr., C. E.	109 Welch, 3245		Wilmington, N. C.
Grissom, R. F., Jr.	Fr., Tex.	109 Bagwell, 3309		Lowell, N. C.
Gross, L. E.	Fr., C. E.	Wilmont Apt. B-3		Raleigh, N. C.
Gupton, B. E.	Jr., Tex. Mgt.	2513 Clark Ave.		High Point, N. C.
Gupton, J. T.	Fr., Ae. E.	204 Bagwell, 3336		Durham, N. C.
Gurganus, W. G.	Fr., E. E.	125 Hawthorne Rd.		Greenville, N. C.
Haig, Mary Ruth (Miss)	Jr., Occ. I. & G.	St. Mary's School		Lufkin, Texas
Haislip, T. M.	Sr., An. Prod.	2302 Hillsboro St.		Oak City, N. C.
Haithcock, W. B.	Fr., C. E.	Withdrew		Robbins, N. C.
Hale, R. J.	Fr., C. E.	104 4th, 3114		Rocky Mount, N. C.
Hales, W. M.	Fr., E. E.	2116 Ridgecrest Rd.		Raleigh, N. C.
Hall, D. A. C., Jr.	Fr., E. E.	230 Bagwell, 3362		Burlington, N. C.
Hall, T. A., Jr.	Fr., E. E.	107 Wat., 3007		Fayetteville, N. C.
Hamilton, N. L.	Fr., C. E.	211 Welch, 3259		Stella, N. C.
Hamilton, R. D.	Fr., Gen. E.	213 Wat., 3031		Kipling, N. C.
Hansen, H. H., Jr.	Fr., M. E.	304 4th, 3130		Humacao, P. R.
Hardesty, G. D., Jr.	Fr., C. E.	308 4th, 3134		New Bern, N. C.
Hardison, N. Winifred (Miss)	Gr., Ag. Ch.	2206 Fairview Rd.		Arapahoe, N. C.
Harper, C. H.	Fr., Ag.	103 Gold, 3203		Snow Hill, N. C.
Harper, W. W.	Sr., C. E.	103 Chamberlain St.		Tarboro, N. C.
Harrell, Doris (Miss)	Fr., Ch. E.	1917 Sunset Drive		Raleigh, N. C.
Harrell, G. O.	Fr., Cer. E.	1517 Hanover St.		Raleigh, N. C.
Harrelson, H. D.	Fr., Ag.	206 Bagwell, 3338		Cherryville, N. C.
Harrelson, W. D.	Fr., Ag.	311 Bagwell, 3377		Whiteville, N. C.
Harris, G. E.	Fr., Ag.	Withdrew		Roxboro, N. C.
Harris, J. L.	Fr., Tex.	514 N. East St.		Raleigh, N. C.
Harris, J. R., Jr.	Fr., Ae. E.	Fieldhouse		Charlotte, N. C.
Harris, K. B.	Fr., E. E.	203 4th, 3121		Mooresville, N. C.
Hart, G. E.	So., Ae. E.	Withdrew		Goldsboro, N. C.
Hart, J. R.	Fr., E. E.	228 Bagwell, 3360		Hickory, N. C.
Hassell, C. C.	Fr., C. E.	304 4th, 3130		Takoma Park, Md.
Hasty, L. C.	Fr., E. E.	Gymnasium		Laurinburg, N. C.
Hasty, W. H., Jr.	So., Ae. E.	2407 Clark Ave.		Maxton, N. C.
Hawkins, J. L.	Fr., Tex.	314 Wat., 3050		Shelby, N. C.
Hayes, C. A.	Fr., Ae. E.	128 Bagwell, 3328		Fayetteville, N. C.
Hayes, E. E., Jr.	Fr., E. E.	202 Bagwell, 3334		Elkin, N. C.
Hayes, I. R.	Fr., E. E.	226 Bagwell, 3358		Norlina, N. C.
Haynes, J. L., Jr.	Fr., Ae. E.	225 Bagwell, 3357		Salisbury, N. C.
Haynie, E. D.	Fr., E. E.	314 Bagwell, 3380		Swannanoa, N. C.
Heath, C. F., Jr.	So., Ag. Ed.	10 Y. M. C. A.		Oxford, N. C.
Hepler, J. S.	Jr., Ae. E.	10 Enterprise St.		Greensboro, N. C.
Herring, E. E.	Fr., Arch. E.	127 Bagwell, 3327		Goldsboro, N. C.
Hewett, A. N.	Fr., E. E.	130 Bagwell, 3330		Wilmington, N. C.
Heyward, W. B.	Sr., Tex.	1720 Hillsboro St.		Charlotte, N. C.
Hicks, Betty Jane (Miss)	Fr., I. Arts Ed.	1539 Iredell Dr.		Raleigh, N. C.
Hicks, H. A.	Fr., M. E.	212 Bagwell, 3344		Asheville, N. C.
Higgins, J. E.	Fr., Ae. E.	Route 1, Cary		Cary, N. C.
Highsmith, C. C.	So., Ag. Ed.	2412 Hillsboro St.		Burgaw, N. C.
Hines, J. E.	Fr., Ch. E.	120 Bagwell, 3320		Spindale, N. C.
Hobbs, J. E.	Gr., For.	203 Wat., 3021		Edenton, N. C.
Hobbs, W. G.	Fr., Ag.	12½ Horne St.		Roseboro, N. C.
Hobgood, T. N., Jr.	Fr., Ag.	107 Gold, 3207		Oxford, N. C.
Hodul, Norman	So., For.	322 Bagwell, 3388		New York, N. Y.
Hoff, F. T.	Fr., Ch. E.	308 E. Park Drive		Raleigh, N. C.
Hoffman, Martin	Fr., Ag.	312 Gold, 3236		New York, N. Y.
Holcomb, W. L.	Fr., Ae. E.	310 Bagwell, 3376		Mt. Airy, N. C.

## NORTH CAROLINA STATE COLLEGE

Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
Holmes, Evelyn S. (Mrs.)	Aud.	1508 Canterbury Rd.		Raleigh, N. C.
Honeycutt, C. H.	Fr., Tex.	318 Bagwell, 3384		Franklinton, N. C.
Honeycutt, W. F.	Fr., Tex.	205 Welch, 3253		Greensboro, N. C.
Hooker, R. J.	Fr., C. E.	109 Welch, 3245		Wilmington, N. C.
Horan, James, Jr.	Fr., C. E.	304 Wat., 3040		Hamlet, N. C.
Horton, W. P.	Fr., Ae. E.	208 Welch, 3256		Sanford, N. C.
Hostevedt, H. L.	Fr., M. E.	3415 Hillsboro St.		Raleigh, N. C.
House, G. M.	So., Ag.	2412 Hillsboro St.		Scotland Neck, N. C.
Hovis, L. S.	So., Ch. E.	300 Horne St.		Dallas, N. C.
Howard, J. S.	Fr., Ae. E.	107 4th, Box 3117		Lenoir, N. C.
Howard, P. N., Jr.	Sr., C. E.	12 Horne St.		Charlotte, N. C.
Howard, W. S.	Fr., Ch. E.	312 Bagwell, 3378		Charlotte, N. C.
Howell, C. J., Jr.	Fr., Ch. E.	217 Wat., 3035		Concord, N. C.
Hudgins, R. H.	Sr., An. Prod.	119 Hillsboro St.		Raleigh, N. C.
Hudson, C. G.	Fr., E. E.	229 Bagwell, 3361		Grimesland, N. C.
Hudson, F. G.	Fr., Ae. E.	315 Bagwell, 3381		Camp Lejeune, N. C.
Hudson, M. W.	So., E. E.	Withdrew		Wilson, N. C.
Huffman, J. C.	Fr., Ch. E.	207 Wat., 3025		Statesville, N. C.
Huggins, D. W., Jr.	So., E. E.	216 Wat., 3034		Clayton, N. C.
Hughes, C. W.	Fr., C. E.	113 Wat., 3013		Roxboro, N. C.
Hughey, R. E.	Fr., Ch. E.	126 Bagwell, 3326		Statesville, N. C.
Humbert, W. F., III	So., E. E.	312 Wat., 3048		Leaksville, N. C.
Hunicutt, W. H.	Fr., C. E.	Route 2		Raleigh, N. C.
Hupp, W. N.	Fr., M. E.	Fieldhouse		Buckhannon, W. Va.
Jackson, A. L.	Fr., Tex.	209 Gold, 3221		Kings Mountain, N. C.
James, W. E.	So., Arch. E.	2212 Hope St.		Farmington, N. C.
Jaramillo, H. J.	Fr., Tex.	312 Gold, 3236		Medellin, Colombia
Jarvis, F. W., Jr.	So., Ae. E.	212 Wat., 3030		Spindale, N. C.
Jernigan, R. K.	Fr., Ag.	Withdrew		Mt. Olive, N. C.
Jerome, Josephine T. (Miss)	Pratt & W.	523 N. East St.		Raleigh, N. C.
Johnson, D. P.	Fr., Ag. Ch.	305 Bagwell, 3371		Delco, N. C.
Johnson, I. A.	So., E. E.	209 Wat., 3027		Rocky Mount, N. C.
Johnson, W. C.	Fr., E. E.	328 Bagwell, 3394		Moncure, N. C.
Johnson, W. E., Jr.	Fr., Gen. E.	307 Welch, 3267		Asheville, N. C.
Johnson, W. O.	Fr., Ag. E.	112 Watauga, 3012		Salisbury, N. C.
Jones, H. A., III	Fr., Arch. E.	102 Wat., 3002		Durham, N. C.
Jones, J. C., Jr.	Fr., Ch. E.	122 N. Salisbury St.		Raleigh, N. C.
Jones, J. T.	Fr., Ae. E.	Withdrew		Greensboro, N. C.
Jones, R. A.	Fr., Ae. E.	Withdrew		Southport, N. C.
Jones, R. C., Jr.	So., C. E.	2412 Hillsboro St.		Reidsville, N. C.
Jones, R. H. W., Jr.	Fr., C. E.	216 Wat., 3034		Guildford College, N. C.
Jones, W. N.	Jr., E. E.	2105 White Oak Rd.		Raleigh, N. C.
Jordan, C. W., Jr.	Fr., Ch. E.	2412 Hillsboro St., Box 5042		Wilmington, N. C.
Jordan, C. Y.	Fr., M. E.	Box 54, Cary		Cary, N. C.
Jordan, F. B.	Fr., Ag.	Withdrew		Mt. Olive, N. C.
Jordan, P. R., Jr.	Fr., Ag.	112 Wat., 3012		Wilmington, N. C.
Kaden, H. A.	So., Tex.	109 Oberlin Rd.		New York, N. Y.
Kako, R. M.	Fr., E. E.	Fieldhouse		Peabody, Mass.
Kamatani, Joe	So., E. E.	Withdrew		McGehee, Ark.
Kamos, G. G.	Fr., C. E.	7 Berry, 4304		Goldsboro, N. C.
Kampschmidt, W. F.	Fr., Ae. E.	224 Bagwell, 3356		Greensboro, N. C.
Kaplan, Morton	Sr., Tex. W. & D.	116 Woodburn Rd.	Forest Hills, L. I., N. Y.	
Kay, D. L.	Fr., C. E.	108 Gold, 3208		Thomasville, N. C.
Kendrick, G. H.	Fr., Cer. E.	112 Bagwell, 3312		Monroe, N. C.
Kendrick, R. F.	Fr., Ae. E.	309 Wat., 3045		Shelby, N. C.
Kengla, Olive W. (Mrs.)	Sp. No Col. Cr.	203 N. Blount St.		Raleigh, N. C.
Kennison, R. W., Jr.	Jr., M. E.	210 Pace St.		Raleigh, N. C.

## STUDENT DIRECTORY

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Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
Killian, R. E.	Fr., Ae. E.	308 Wat., Box 3044		Lincolnton, N. C.
Kilpatrick, F. M., Jr.	Fr., Ag.	105 Berry, 4305		Ayden, N. C.
King, A. B.	So., Ae. E.	102 Berry, 4302		St. Pauls, N. C.
King, A. Merlyn (Miss)	Fr., Tex.	111 Brooks Ave.		Wallace, N. C.
King, G. W., Jr.	Fr., C. E.	309 Bagwell, 3375		Charlotte, N. C.
King, H. W.	Fr., Ag.	Gym		Pembroke, Bermuda
Kirk, D. D.	Fr., Ag. Ed.	106 Welch, 3242		Aberdeen, N. C.
Kirkman, R. A.	Fr., E. E.	Route 5		Raleigh, N. C.
Kistler, C. E.	Fr., C. E.	304 Gold, 3228		Star, N. C.
Kluttz, B. E.	Fr., C. E.	311 Wat., 3047		Concord, N. C.
Klyman, M. Katherine	Fr., Occ. I. & G.	1806 Chester Rd.		Raleigh, N. C.
Knight, W. A., Jr.	Fr., Ae. E.	318 Bagwell, 3384		Biltmore, N. C.
Kohler, Stanley	So., E. E.	125 Woodburn Rd.		New York, N. Y.
Lackey, J. M.	Fr., Ae. E.	111 Welch, 3247		Hiddenite, N. C.
Lail, G. D.	Fr., Ch. E.	112 Bagwell, 3312		Monroe, N. C.
Lambert, L. W.	Fr., C. E.	308 Welch, 3268		Mullins, S. C.
Lamprinakos, P. J.	So., M. E.	10 Enterprise St.		Asheville, N. C.
Landon, L. M.	Fr., E. E.	307 Bagwell, 3373		Weaverville, N. C.
Lard, Kathleen E. (Miss)	Pratt & W.	601 Hinsdale St.		St. Joseph, Mo.
Lassiter, M. V., Jr.	Sr., M. E.	103 Chamberlain St.		Richmond, Va.
Latham, R. Q.	Fr., Tex.	205 Wat., 3023		Spray, N. C.
Laughlin, R. C.	Sr., Ch. E.	1720 Hillsboro St.		Tarboro, N. C.
Laughridge, K. M.	Fr., C. E.	307 Gold, 3231		Marion, N. C.
Leach, J. A.	Fr., M. E.	Withdrew		Franklin, N. C.
Leary, W. C.	Fr., Ae. E.	121 Bagwell, 3321		Edenton, N. C.
Leatherman, B. H.	Fr., Tex.	211 Bagwell, 3343		Lexington, N. C.
Leazar, J. D.	Fr., Ag.	101 Welch, 3237		College Park, Ga.
Lee, A. G.	Fr., E. E.	134 Bagwell, 3402		Benson, N. C.
Lee, J. W.	Fr., Ae. E.	105 Bagwell, 3305		Dunn, N. C.
Leggett, D. W.	Fr., M. E.	203 Bagwell, 3335		Scotland Neck, N. C.
Lenhart, J. A.	Fr., Occ. I. & G.	Fieldhouse		Duquesne, Pa.
Leonard, B. T.	Jr., Hort.	126 Forest Rd.		Norfolk, Va.
Leonard, Samuel Edwin	Gr., Ru. Soc.	1624 Oberlin Rd.		Raleigh, N. C.
Leonard, Shelley Elbert	Fr., M. E.	8 Berry, 4341		Ramseur, N. C.
Lewis, H. J.	Fr., Ch. E.	101 Gold, 3201		Louisburg, N. C.
Linkous, W. H.	Gr., Ag. Ec.	217 N. Wilmington St.		Vicker, Va.
Lisak, E. F.	Fr., I. Arts Ed.	Fieldhouse		Wheeling, W. Va.
Little, Zeb	Fr., Tex.	2407 Clark Ave.		Lexington, N. C.
Littlefield, B. E., Jr.	Fr., Cer. E.	207 Bagwell, 3339		Fairmont, N. C.
Livingston, E. M.	Fr., M. E.	229 Bagwell, 3361		Laurel Hill, N. C.
Lockhart, J. K.	So., Ch. E.	303 Welch, 3263		Hillsboro, N. C.
Loewensberg, Sylvia (Mrs.)	Gr., Ag. Ch.	2707 Bedford Ave.		Raleigh, N. C.
Loewensberg, Walter	Gr., M. E.	2707 Bedford Ave.		Raleigh, N. C.
Lomax, R. F.	Fr., C. E.	133 Bagwell, 3401		Lenoir, N. C.
Lovelace, D. F., Jr.	Fr., Occ. I. & G.	200 W. Whitaker Mill Rd.		Raleigh, N. C.
Lovill, E. F.	Fr., M. E.	214 Bagwell, 3346		Mt. Airy, N. C.
Lovill, R. C.	Fr., M. E.	214 Bagwell, 3346		Mt. Airy, N. C.
Lowery, W. S.	Fr., M. E.	334 Bagwell, 3400		Charlotte, N. C.
Lutz, W. A.	Fr., Tex.	314 Wat., 3050		Shelby, N. C.
Lynch, E. P., Jr.	So., Ch. E.	104 Berry, 4304		Charlotte, N. C.
Lynch, M. K.	Fr., Ae. E.	312 Welch, 3272		Slater, S. C.
Lynn, W. W.	Fr., For.	333 Bagwell, 3399		Greenville, Ala.
McCall, J. A.	So., Tex.	1720 Hillsboro St.		Reidsville, N. C.
McCleney, D. D.	Fr., M. E.	324 Bagwell, 3390		Chadbourg, N. C.
McConnaughey, W. J.	So., Ae. E.	2412 Hillsboro		Red Springs, N. C.
McCormick, T. J., Jr.	Fr., M. E.	218 Bagwell, 3350		Rowland, N. C.
McDaniel, Laura E. (Miss)	Fr., M. E.	Meredith College		Kinston, N. C.
McGee, F. F.	Fr., M. E.	308 Welch, 3268		Mt. Airy, N. C.

## NORTH CAROLINA STATE COLLEGE

Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
McLamb, D. L.	Fr., E. E.	116 Wat., 3016		Clinton, N. C.
McLamb, Eula P. (Miss)	Gr., Ag. Ch.	134 New Bern Ave.		Clinton, N. C.
McLaughlin, Helen A. (Miss)	Gr., Oc I&G.	301 N. Blount St.		Raleigh, N. C.
McLean, R. A., Jr.	Fr., E. E.	110 Bagwell, 3310		Mt. Olive, N. C.
McLeod, H. M.	Fr., Ag.	205 Gold, 3217		Carthage, N. C.
McLeod, J. A., Jr.	Fr., Ae. E.	110 Wat., 3010		Jonesboro, N. C.
MacNeill, J. L.	So., Ae. E.	2407 Clark Ave.		Maxton, N. C.
McNeill, R. E.	Fr., Ae. E.	311 Gold, 3235		Wade, N. C.
McNeill, R. N.	Fr., M. E.	1616 Hillsboro St.		Marion, N. C.
McRackan, Ada A. (Miss)	Gr., Ru. Soc.	123 Montgomery St.		Raleigh, N. C.
McRainey, J. R.	Fr., For.	Fieldhouse		Fayetteville, N. C.
Madden, Lois M. (Miss)	Fr., Gen. E.	2100 Hillsboro St.		Bridgeport, Conn.
Maddock, J. G.	Fr., E. E.	Fieldhouse		Tarentum, Pa.
Maddry, L. G.	Gr., Pl. Path.	Box 711, Raleigh		Nazareth, N. C.
Maddux, H. T., Jr.	Fr., Gen. E.	2404 Everett Ave.		Raleigh, N. C.
Mahoney, E. J.	Jr., C. E.	12½ Horne St.		Brooklyn, N. Y.
Mandel, N. W.	So., Tex.	109 Oberlin Rd.		New York, N. Y.
Maner, J. E.	So., Ae. E.	R.F.D. 3, Box 98		Raleigh, N. C.
Mann, J. H.	Fr., Ag.	State Col. Dairy		Pittsboro, N. C.
Mann, L. A., Jr.	So., Ch. E.	Infirmary		Newport, N. C.
Manning, C. L., Jr.	Fr., Ag. E.	308 Bagwell, 3374		Robersonville, N. C.
Manning, H. L.	Gr., Exp. Stat.	123 Halifax St.		London, England
Marine, Z. O.	Fr., C. E.	204 Bagwell, 3336		Sneads Ferry, N. C.
Marks, W. H.	Fr., C. E.	Withdrew		Virgina, Va.
Marsh, W. B., Jr.	Fr., E. E.	130 Bagwell, 3332		Marshville, N. C.
Marshall, Katharine E. (Miss)	Pratt & W.	601 Hinsdale		Washington, D. C.
Martin, J. R.	So., Ch. E.	300 Horne St.		Cramerton, N. C.
Martin, W. D.	Fr., C. E.	220 Bagwell, 3352		Fayetteville, N. C.
Massengill, H. K.	Sr., Tex.	525 N. Bloodworth St.		Raleigh, N. C.
Masten, G. M., Jr.	Fr., M. E.	304 Wat., 3040		Winston-Salem, N. C.
Matlock, T. L.	Fr., M. E.	311 Welch, 3271		Hiddenite, N. C.
Matthews, C. L.	So., Ch. E.	302 Bagwell, 3368		East Bend, N. C.
Matthews, G. P.	So., E. E.	103 Chamberlain St.		Nashville, N. C.
Matusow, D. M.	Sr., Ae. E.	109 Oberlin Rd.		New York, N. Y.
Maultsby, K. A.	So., C. E.	2 Berry, 4335		Jacksonville, N. C.
May, D. C., Jr.	Fr., E. E.	103 Welch, 3239		New Bern, N. C.
Meares, S. H.	Fr., Ae. E.	2408 Everett Ave.		Raleigh, N. C.
Mellon, J. D., Jr.	Fr., Ae. E.	304 Bagwell, 3370		Winterville, N. C.
Mercer, A. W.	Fr., Ae. E.	319 Bagwell, 3385		Pink Hill, N. C.
Mercer, D. L., Jr.	Fr., Ag. Ed.	105 Welch, 3241		Bolivia, N. C.
Merritt, R. E.	Fr., Cer. E.	218 Wat., 3036		Mt. Airy, N. C.
Messinger, Arnold	Fr., Tex.	201 4th, Box 3119		Roosevelt, N. Y.
Miller, Mrs. Bregetta M. Sp.	No Col. Cr.	Withdrew		Raleigh, N. C.
Miller, E. L., Jr.	Gr., Geol. E.	2402 Clark Ave., Apt. 9		Raleigh, N. C.
Miller, H. D.	Fr., Ae. E.	203 Welch, 3251		Greensboro, N. C.
Miller, L. B., Jr.	Fr., Ag. E.	309 Welch, 3269		Merritt, N. C.
Miller, L. H.	Fr., Ag.	110 Bagwell, 3310		Camp Davis, N. C.
Miller, Mary Elizabeth (Miss)	Fr., Tex.	226 Chamberlain St.		Raleigh, N. C.
Mills, G. A.	Fr., E. E.	133 Bagwell, 3401		Watha, N. C.
Millsaps, J. C.	So., C. E.	206 Wat., 3024		Statesville, N. C.
Mitchell, R. E.	Fr., Ae. E.	310 Gold, 3234		Greensboro, N. C.
Mitchell, W. H.	Fr., Ag.	Greenhouse, Box 5254		King, N. C.
Mizelle, M. B.	Jr., C. E.	201 Welch, 3249		Bethel, N. C.
Monroe, J. M.	So., Ae. E.	2513 Clark Ave.		Hamlet, N. C.
Montgomery, J. R.	Fr., Ae. E.	126 Bagwell, 3326		Statesville, N. C.
Moore, J. L.	Fr., Ag. Ed.	113 Bagwell, 3313		Jamesville, N. C.
Moore, S. I.	Fr., Ae. E.	203 Gold, 3215		Burlington, N. C.
Moore, W. C., Jr.	Fr., E. E.	109 Wat., 3009		New Bern, N. C.
Mooring, R. F.	Fr., M. E.	101 4th, 3111		Goldsboro, N. C.

## STUDENT DIRECTORY

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Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
Morgan, J. F.	Fr., Ag.	Basement, 1911, Box 5421	Peachland, N. C.	
Morgan, K. D., Jr.	So., Ch. E.	Gym	Tarboro, N. C.	
Morgan, T. J.	So., Ag.	120 Forest Rd.	Peachland, N. C.	
Morgan, W. W.	Fr., C. E.	Withdrew	Spring Hope, N. C.	
Morrow, R. A.	Fr., E. E.	223 Bagwell, 3355	Albemarle, N. C.	
Morton, B. S.	Fr., M. E.	223 Bagwell, 3355	Albemarle, N. C.	
Moss, J. T.	So., Ag.	208 4th, Box 3126	Youngsville, N. C.	
Murdoch, A. W.	Fr., E. E.	202 Welch, 3250	Wildwood, N. C.	
Mussack, W. J., Jr.	Fr., Ae. E.	203 Bagwell, 3335	Halifax, N. C.	
Myers, F. B.	Fr., E. E.	306 Bagwell, 3372	Pinehurst, N. C.	
Myers, J. M.	Fr., Arch. E.	107 Bagwell, 3307	Greensboro, N. C.	
Nackos, C. J.	Sr., C. E.	10 Enterprise St.	Wilson, N. C.	
Nadjar, J. G.	Sr., Tex.	12 Horne St.	Santiago, Chile	
Nash, Eugenia (Miss)	So., Occ. I. & G.	Peace College	St. Pauls, N. C.	
Naugler, A. W.	Fr., M. E.	Fieldhouse	Beverly, Mass.	
Neal, J. W.	Fr., Ae. E.	519 Daughtridge Rd.	Raleigh, N. C.	
Negron, Henry	Sr., C. E.	123 Bagwell, 3323	San Juan, P. R.	
Nelson, Ernestine E. (Miss)	Sr., W. & D.	4 Maiden Lane	Alhambra, Cal.	
Nichols, C. H.	Fr., E. E.	125 Hawthorne Rd.	Greenville, N. C.	
Nicholson, W. M.	Sr., Ch. E.	12 Horne St.	Winston-Salem, N. C.	
Noell, E. S., Jr.	Fr., E. E.	310 Wat., 3046	Durham, N. C.	
Noneman, R. L.	Fr., For.	2106 White Oak Rd.	Raleigh, N. C.	
Northcott, Mary E. (Miss)	Pratt & W.	220 E. North St.	Raleigh, N. C.	
Norwood, J. E.	So., Ch. E.	204 Wat., 3022	Raleigh, N. C.	
Olive, Emily L. (Miss)	Fr., M. E.	Meredith College	Raleigh, N. C.	
O'Neal, G. M.	Fr., Ae. E.	305 Gold, 3229	Swan Quarter, N. C.	
O'Neal, R. L.	Fr., Ae. E.	Route 1, Neuse	Neuse, N. C.	
O'Neal, W. J., Jr.	Fr., C. E.	558 New Bern Ave.	Raleigh, N. C.	
Orr, E. A.	So., Ch. E.	315 Wat., 3051	Rocky Mount, N. C.	
Overing, R. E.	Fr., Ch. E.	Route 4	Raleigh, N. C.	
Ozsoy, F. A.	Fr., Tex.	302 4th, 3128	Ankara, Turkey	
Paaffe, Basil	Fr., E. E.	301 4th, 3127	New Bern, N. C.	
Page, F. L., III	So., Ch. E.	2407 Clark Ave., Box 5456	Zebulon, N. C.	
Page, W. F.	Fr., E. E.	313 Bagwell, 3379	Fairmont, N. C.	
Pair, P. V., Jr.	Fr., Ae. E.	Route 1, Knightdale	Knightdale, N. C.	
Parker, D. M., Jr.	Fr., M. E.	103 Bagwell, 3303	New Bern, N. C.	
Parker, E. L.	Fr., Ag. Ed.	310 Welch, 3270	Angier, N. C.	
Parker, G. W.	Jr., Ch. E.	302 Bagwell, 3368	Murfreesboro, N. C.	
Parker, P. E., Jr.	Fr., E. E.	111 Gold, 3211	Lasker, N. C.	
Parnag, John	So., Ch. E.	1720 Hillsboro St.	Durham, N. C.	
Parrish, W. W.	Fr., M. E.	Withdrew	Henderson, N. C.	
Parthemos, C. N.	Fr., Ch. E.	222 Bagwell, 3354	Asheville, N. C.	
Patterson, W. S.	Fr., M. E.	311 Welch, 3271	Stony Point, N. C.	
Peele, R. E.	Fr., Ae. E.	118 Bagwell, 3318	Roxobel, N. C.	
Perez, M. E.	Gr., Zool. & Ent.	132 Woodburn Rd.	San Juan, P. R.	
Perry, A. N.	Sr., M. E.	103 Chamberlain St.	Hamlet, N. C.	
Perry, W. F., Jr.	Fr., E. E.	9 Berry, 4342	Bailey, N. C.	
Perryman, J. A.	Fr., M. E.	103 4th, 3113	Thomasville, N. C.	
Peterson, W. P.	Fr., E. E.	102 Welch, 3238	Clinton, N. C.	
Pfaff, A. M.	So., E. E.	103 Berry, 4303	Tobaccoville, N. C.	
Phillips, J. R.	Fr., Tex.	209 Welch, 3257	Greensboro, N. C.	
Phillips, T. K.	Fr., E. E.	108 Bagwell, 3308	Greensboro, N. C.	
Pickett, A. E.	Fr., M. E.	Fieldhouse	Spencer, N. C.	
Pierce, J. W.	Fr., Ag.	1 Berry, 4334	Baltimore, Md.	
Pinnix, M. H.	Fr., Ch. E.	211 Wat., 3029	Oxford, N. C.	
Pippin, J. L.	Fr., Ae. E.	204 Gold, 3216	Fremont, N. C.	
Pittman, R. A.	Fr., Ag.	105 Berry, 4305	Biscoe, N. C.	

## NORTH CAROLINA STATE COLLEGE

Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
Pitts, R. L., Jr.	Jr., Ae. E.	2407 Clark Ave.	Spring Hope, N. C.	
Plyler, R. A., Jr.	Fr., Ch. E.	10, 1911	Waxhaw, N. C.	
Poe, H. V.	Sr., E. E.	120 Woodburn Rd.	Apex, N. C.	
Poitras, A. A.	Sr., Tex. C. & D.	104 Berry, 4304	New Bedford, Mass.	
Polk, R. L.	Fr., Ae. E.	212 Gold, 3224	Winston-Salem, N. C.	
Ponos, N. J.	Sr., Ch. E.	204 Berry, 4311	Wilmington, N. C.	
Porter, Sarah H. (Miss)	Gr., Ag. Ec.	700 N. East St.	Raleigh, N. C.	
Potts, W. A.	Fr., M. E.	305 Gold, 3229	Mt. Olive, N. C.	
Powell, R. J.	Fr., Ch. E.	309 Gold, 3233	Kannapolis, N. C.	
Pressly, Harriet B. (Miss)	Sr., Ag. Ch.	526 Wilmington St.	Raleigh, N. C.	
Preston, L. W., Jr.	Fr., Ch. E.	Withdrew	Wilmington, N. C.	
Price, C. H.	Fr., E. E.	102 Berry, 4302	Gastonia, N. C.	
Price, N. A.	So., E. E.	221 Bagwell, 3353	Rocky Mount, N. C.	
Prunty, R. W.	Fr., E. E.	107 Wat., 3007	Charlotte, N. C.	
Rackley, A. E.	Fr., Ae. E.	105 4th, 3115	Willard, N. C.	
Ramos, J. A.	Gr., Zool. & Ent.	132 Woodburn Rd.	Mayaguez, P. R.	
Rankin, J. R.	Fr., E. E.	108 Bagwell, 3308	Greensboro, N. C.	
Rattelade, J. H., Jr.	Fr., Tex.	Fieldhouse	Durham, N. C.	
Rawls, H. D.	Gr., Ru. Soc.	Apt. G-2, Country C. Homes	Raleigh, N. C.	
Rawls, Rachel F. (Mrs.)	Gr., Occ. I. & G.	Apt. G-2, Country C. Homes	Raleigh, N. C.	
Ray, W. T.	Fr., Arch. E.	102 Gold, 3202	Chapel Hill, N. C.	
Reins, R. R.	Fr., E. E.	311 Wat., 3047	N. Wilkesboro, N. C.	
Reiter, Naftali	Sr., Tex.	109 Oberlin Rd.	Lima, Peru	
Renfrow, J. A.	Fr., E. E.	204 Bagwell, 3370	Kenly, N. C.	
Reyes Spindola, P. L.	So., Tex.	122 Bagwell, 3322	Mexico City, Mex.	
Reynolds, D. S., Jr.	Ae. E.	130 Bagwell, 3330	Wilmington, N. C.	
Rhodes, M. R.	Fr., E. E.	209 Wat., 3027	New Bern, N. C.	
Rhodes, P. T. E.	Fr., Ae. E.	129 Bagwell, 3329	Statesville, N. C.	
Rhue, D. B.	Fr., E. E.	202 Welch, 3250	Newport, N. C.	
Rhyne, G. W., Jr.	Fr., E. E.	101 Bagwell, 3301	Catawba, N. C.	
Rhyne, T. S., Jr.	Fr., For.	108 4th, 3118	Charlotte, N. C.	
Richardson, Eliz. T. (Miss)	Gr., Ru. Soc.	2015 Glenwood Ave.	Raleigh, N. C.	
Richkus, Charles	Fr., Tex.	Fieldhouse	Hillside, N. J.	
Riggan, W. H., Jr.	Fr., Ind. E.	3 Berry, 4336	Macon, N. C.	
Ritchie, J. F.	Fr., Ch. E.	307 4th, 3133	Richfield, N. C.	
Roberson, W. R.	Fr., E. E.	2513 Clark Ave.	Stokes, N. C.	
Robertson, D. A., Jr.	So., C. E.	333 Bagwell, 3399	Mt. Airy, N. C.	
Robertson, W. C.	So., Ae. E.	208 Wat., 3026	Goldsboro, N. C.	
Robinson, J. W.	Fr., Ag.	308 Bagwell, 3374	Rose Hill, N. C.	
Roe, W. C.	Fr., Ind. E.	317 Bagwell, 3383	Concord, N. C.	
Roebuck, J. W.	Fr., Ae. E.	206 Welch, 3254	Stokes, N. C.	
Rogers, E. H.	Fr., Ag. Ed.	128 Bagwell, 3328	Clyde, N. C.	
Rogers, Lawrence	Fr., Ag. Ed.	306 Wat., 3042	Roxboro, N. C.	
Rollins, M. D.	Fr., E. E.	111 Welch, 3247	Grover, N. C.	
Rollins, W. H.	Fr., Tex.	210 Welch, 3258	Spindale, N. C.	
Rose, H. L.	So., C. E.	218 Bagwell, 3350	Kenly, N. C.	
Ross, H. D.	Fr., Arch. E.	119 Bagwell, 3319	Kernersville, N. C.	
Ross, J. N.	Fr., C. E.	108 Welch, 3244	Monroe, N. C.	
Ross, R. G., Jr.	Sr., Gen. E.	12 Horne St.	Charlotte, N. C.	
Rosser, J. F.	Fr., Ag.	2305 Clark Ave.	Broadway, N. C.	
Routh, R. F.	Fr., Ae. E.	210 Gold, 3222	Asheboro, N. C.	
Rowe, E. R.	Sr., M. E.	18½ Horne St.	Aberdeen, N. C.	
Rowland, W. B.	Fr., Ag.	117 Bagwell, 3317	Kittrell, N. C.	
Russell, F. C.	So., Arch.	215 Bagwell, 3347	Islamara, Fla.	
Russell, R. W., Jr.	So., Ae. E.	101 Berry, 4301	High Point, N. C.	
Sakas, G. G.	Fr., Tex.	Fieldhouse	Wilson, N. C.	
Saltzman, Cyma M. (Miss)	Fr., Tex.	308 Pogue St.	Brooklyn, N. Y.	
Salyer, J. W.	Fr., Ae. E.	Withdrew	Wilmington, N. C.	

## STUDENT DIRECTORY

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Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
Sanders, J. L.	Fr., Arch. E.	225 Bagwell, 3357	Four Oaks, N. C.	
Sanders, R. F.	Fr., E. E.	317 Wat., 3053	Alamance, N. C.	
Sapp, J. D.	Fr., E. E.	322 Bagwell, 3388	Salisbury, N. C.	
Sasser, M. C.	Sr., Ind. E.	4 Fern dell Lane		Selma, N. C.
Savage, R. P.	Fr., C. E.	105 4th, 3115		Willard, N. C.
Scarpa, J. J.	Fr., Tex.	Fieldhouse		Ansonia, Conn.
Schuck, G. I.	So., Ae. E.	17 Enterprise St.		Lyndhurst, N. J.
Scott, W. L.	Fr., Ag.	2408 Stafford Ave.		Rosehill, N. C.
Seawell, L. M., Jr.	Fr., E. E.	301 Gold, 3225	Winston-Salem, N. C.	
Seay, F. S., Jr.	So., C. E.	2514 Clark Ave.		Reidsville, N. C.
Self, W. C.	Fr., Ae. E.	1610 St. Mary's St.		Raleigh, N. C.
Sellers, E. G.	So., Gen. E.	1720 Hillsboro St.		Charlotte, N. C.
Senter, M. S.	Fr., M. E.	303 Welch, 3263	Chalybeate Springs, N. C.	
Sewell, D. W.	Fr., Cer. E.	109 Gold, 3209		Greensboro, N. C.
Sharp, D. R.	Fr., Tex.	Withdrew		Saugus, Mass.
Sharpe, J. J.	So., M. E.	117 Wat., 3017		Spencer, N. C.
Shaw, R. A.	Fr., Ae. E.	312 Wat., 3048		Leaksville, N. C.
Shelburne, V. B., Jr.	Sr., Ch. E.	325 Bagwell, 3391	Washington, N. C.	
Sherrill, K. A., Jr.	Fr., C. E.	301 4th, 3127		Mooresville, N. C.
Sherrill, Marianna (Miss)	Pratt & W.	2717 Vanderbilt Ave.		Statesville, N. C.
Shomaker, J. V.	Fr., M. E.	205 Gold, 3217		Banner Elk, N. C.
Shore, H. F.	Fr., E. E.	110 Gold, 3210		Boonville, N. C.
Sigmon, I. A.	Fr., Arch. E.	2209½ Hope St.		Reidsville, N. C.
Simmons, J. D.	Fr., Ae. E.	307 Wat., 3043		Ash, N. C.
Sink, C. B.	So., Tex.	215 Wat., 3033		Lexington, N. C.
Sink, H. T.	Fr., Gen. E.	210 Bagwell, 3342		Mooresville, N. C.
Slifka, Philip	Fr., Tex.	301 Bagwell, 3367	Lawrence, L. I., N. Y.	
Smith, A. C.	Sr., C. E.	Y. M. C. A.		Mooresville, N. C.
Smith, C. A., Jr.	Fr., E. E.	Box 45, Cary		Cary, N. C.
Smith, C. L.	Fr., Ae. E.	303 Bagwell, 3369	Fairmont, N. C.	
Smith, G. L., Jr.	Fr., Ae. E.	316 Bagwell, 3382	Gibson, N. C.	
Smith, G. W.	So., Ae. E.	1720 Hillsboro St.		Durham, N. C.
Smith, J. H.	Fr., Tex.	205 Wat., 3023		Fieldale, Va.
Smith, N. J.	Fr., Cer. E.	227 Bagwell, 3359		Durham, N. C.
Smithdeal, W. C.	Fr., Arch. E.	1802 Fairview Rd.		Raleigh, N. C.
Smithson, N. D.	Fr., Ag.	331 Bagwell, 3397		Asheville, N. C.
Snider, H. L.	Fr., C. E.	211 Gold, 3223		Denton, N. C.
Snipes, O. C.	Fr., M. E.	301 Gold, 3225		Varina, N. C.
Snow, P. L.	Fr., E. E.	220 N. East St.		Raleigh, N. C.
Snyder, F. C.	So., Arch. E.	2513 Clark Ave.	Winston-Salem, N. C.	
Sox, T. E.	Fr., E. E.	Cary		Cary, N. C.
Spamer, C. W., Jr.	Fr., E. E.	Fieldhouse		Wilkinsburg, Pa.
Spencer, J. A.	Fr., C. E.	202 Gold, 3214		Carthage, N. C.
Stanley, J. C., Jr.	Fr., Ag. Ed.	102 Gold, 3202		Ruffin, N. C.
Staton, L. E.	Fr., M. E.	202 Wat., 3020		Palmyra, N. C.
Stauffer, H. W., Jr.	Fr., E. E.	303 4th, 3129		Marion, N. C.
Stavenhagen, M. S.	So., Ch. E.	17 Enterprise St.		Fayetteville, N. C.
Steinert, Beverly S. (Miss)	Gr., Entom.	Peace College		Raleigh, N. C.
Stevens, H. L.	Fr., Ag.	204 Welch, 3252		Smithfield, N. C.
Stevens, Lillian E. (Miss)	Gr., Ag. Ch.	708 W. Jones St.		Raleigh, N. C.
Stevenson, D. B.	Fr., Ae. E.	129 Bagwell, 3329		Statesville, N. C.
Stewart, D. E.	Fr., Tex.	201 Wat., 3019		Washington, N. C.
Stilwell, M. G.	Fr., Tex.	115 Bagwell, 3315		Thomasville, N. C.
Stinson, J. B.	So., Ag. Ed.	304 Welch, 3264		Boonville, N. C.
Stokes, T. A., Jr.	Fr., Ae. E.	234 Bagwell, 3366		Durham, N. C.
Storey, C. V.	Fr., E. E.	110 Wat., 3010		Dunn, N. C.
Stott, C. W.	Fr., M. E.	303 Gold, 3227		Whiteville, N. C.
Straus, J. A.	So., Tex.	201 Wat., 3019		New York, N. Y.
Strole, J. P.	Fr., Ag.	18 Horne St.		Chadbourne, N. C.

## NORTH CAROLINA STATE COLLEGE

Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
Stroup, K. E.	Fr., Ae. E.	201 Bagwell, 3333		Cherryville, N. C.
Stuart, A. N.	Gr., Tex. C. & D.	201 Gold, 3213		Snow Camp, N. C.
Stuart, B. J.	Fr., M. E.	Fieldhouse		Cary, N. C.
Styers, J. D., Jr.	Fr., E. E.	227 Bagwell, 3359		Gastonia, N. C.
Sutton, F. H.	Fr., M. E.	912 Boylan Drive		Raleigh, N. C.
Sutton, H. F.	Fr., Tex.	203 Gold, 3215		Burlington, N. C.
Sutton, J. B.	Fr., M. E.	302 Wat., 3038		Goldsboro, N. C.
Swartz, D. R.	Fr., Ae. E.	106 Wat., 3006		Wilmington, N. C.
Swartz, Marvin	So., M. E.	109 Oberlin Rd.		Winston-Salem, N. C.
Swartzberg, F. L.	So., Ae. E.	Fieldhouse		High Point, N. C.
Tart, J. L.	Fr., Ag.	101 Wat., 3001		Four Oaks, N. C.
Tatum, E. C., Jr.	Fr., Ag. Ed.	306 Wat., 3042		Cooleemee, N. C.
Taylor, J. C., Jr.	Fr., Ag.	101 Welch, 3237		Durham, N. C.
Taylor, J. W., Jr.	Fr., Tex.	314 Bagwell, 3380		Asheville, N. C.
Teabeaut, T. A.	Fr., M. E.	320 Bagwell, 3386		Fayetteville, N. C.
Teachey, Remus	Fr., Ae. E.	134 Bagwell, 3402		Seven Springs, N. C.
Teague, R. J.	Fr., C. E.	112 Welch, 3248		Siler City, N. C.
Terrell, W. B., Jr.	So., Ae. E.	208 4th, 3126		Wadesboro, N. C.
Tharrington, G. T.	So., Ch. E.	1720 Hillsboro St.		Henderson, N. C.
Thayer, F. K., Jr.	Fr., C. E.	302 Welch, 3262		Robbins, N. C.
Thomas, W. C.	Jr., Ch. E.	110 Welch, 3246		Weldon, N. C.
Thomason, J. F.	Fr., M. E.	103 4th, 3113		Kannapolis, N. C.
Thompson, A. L.	Fr., Ae. E.	Withdrew		Jacksonville, N. C.
Thompson, A. T.	Fr., Ag.	110 Welch, 3246		Whitakers, N. C.
Thompson, Carl, Jr.	Fr., Ae. E.	330 Bagwell, 3396		Cameron, N. C.
Thompson, L. F., Jr.	Fr., C. E.	308 4th, 3134		New Bern, N. C.
Tickel, J. J.	Fr., M. E.	302 Gold, 3226		Roanoke Rapids, N. C.
Timberlake, J. D.	Fr., Ch. E.	202 4th, 3120		Oxford, N. C.
Tippett, C. S., Jr.	Fr., Tex.	111 Bagwell, 3311		Henderson, N. C.
Todd, F. A.	Gr., Pl. Path.	Zebulon		Wendell, N. C.
Towell, R. M.	Fr., Ae. E.	302 4th, 3128		Kannapolis, N. C.
Trott, H. N.	Fr., For.	Withdrew		Richlands, N. C.
Truitt, J. H.	Fr., M. E.	201 4th, 3119		Greensboro, N. C.
Tucker, J. B., II	Fr., E. E.	316 Bagwell, 3382		Grimesland, N. C.
Tucker, Louisa N. (Miss)	Gr., Ag. Ch.	2316 Hillsboro St.		Danville, Va.
Turbyfill, G. L.	Fr., Ag. Ed.	Fieldhouse		Maiden, N. C.
Turner, H. F.	Fr., Occ. I. & G.	Fieldhouse		Rocky Mount, N. C.
Tysinger, T. W.	Fr., E. E.	215 Wat., 3033		Lexington, N. C.
Tyson, M. E., Jr.	Fr., Ae. E.	202 Bagwell, 3334		Elkin, N. C.
Underwood, F. D.	Fr., Arch. E.	308 Gold, 3232		Wilkesboro, N. C.
Underwood, Mary (Miss)	Gr., I. Arts Ed.	Cary		Cary, N. C.
Valderrama, L. H.	So., Tex.	205 4th, 3123		Huaral, Peru
Valencia, Salvador	So., Tex.	122 Bagwell, 3322		Mexico City, Mex.
Vance, J. E.	Fr., Ae. E.	205 Bagwell, 3337		Fair Bluff, N. C.
Van Dresser, W. M., Jr.	Fr., Tex.	204 4th, 3122		Lincolnton, N. C.
Varon, Isaac	Jr., W. & D.	109 Oberlin Rd.		Lima, Peru
Vinson, S. G.	Fr., Ch. E.	127 Bagwell, 3327		Ahoskie, N. C.
Wade, W. E., Jr.	Sr., Ae. E.	1720 Hillsboro St.		Union City, Tenn.
Waidler, F. P., Jr.	Jr., M. E.	131 Hawthorne Rd.		Raleigh, N. C.
Walden, C. E., Jr.	Fr., M. E.	4 Berry, 4337		Tabor City, N. C.
Walker, C. H., Jr.	So., E. E.	2504 Van Dyke Ave.		Raleigh, N. C.
Walker, H. C.	Fr., Ae. E.	107 Welch, 3243		Clayton, N. C.
Walker, Jack	Fr., E. E.	332 Bagwell, 3398		Marion, N. C.
Walker, J. B., Jr.	Fr., E. E.	Fieldhouse		Marion, N. C.
Wallace, Martha L. (Miss)	Sr., W. & D.	1200 Glenwood Ave.		Raleigh, N. C.
Wallner, Siegfried, Jr.	So., Tex.	12 Horne St.		Jacksonville, Texas

## STUDENT DIRECTORY

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Name	Classification	Dorm. Box No. or St. No.	School Address	Home Address
Walls, L. J., Jr.	Fr., M. E.	105 Welch, 3241		Bolivia, N. C.
Ward, D. L.	Jr., E. E.	Withdrew		Thomasville, N. C.
Ward, J. H.	Fr., M. E.	213 Bagwell, 3345		Edenton, N. C.
Ward, W. L.	Fr., Ag.	231 Bagwell, 3363		Clinton, N. C.
Warner, H. P.	Gr., Tex.	30 Shepherd St.		Raleigh, N. C.
Watkins, G. S.	So., E. E.	6 Enterprise St.		Charlotte, N. C.
Watson, J. L.	Fr., E. E.	Route 4		Raleigh, N. C.
Waynick, D. L.	Sr., Tex. Mgt.	12 Horne St.		Greensboro, N. C.
Weaver, A. F., III	Fr., Ag.	104 Welch, 3240		Asheville, N. C.
Webster, F. L., Jr.	So., E. E.	2513 Clark Ave.		Winston-Salem, N. C.
Wehbie, W. M.	Fr., Tex.	425 N. Bloodworth St.		Raleigh, N. C.
Weiss, H. S.	Fr., Ag.	109 Oberlin Rd.		Brooklyn, N. Y.
West, Gladys F. (Miss)	Gr., Exp. Stat.	1324 Brooks Ave.		Columbus, Neb.
West, J. J.	Fr., Tex.	201 Bagwell, 3333		Charlotte, N. C.
Westfall, A. W.	Fr., M. E.	Fieldhouse		Los Angeles, Calif.
Westlake, C. R.	So., Cer. E.	119 Hawthorne Rd.		Sycamore, Ill.
Weyne, J. M.	Jr., M. E.	Basement 1911, Box 5241		
White, B. A.	Fr., C. E.	206 Wat., 3024		Bixschoot, Belgium
White, G. C., Jr.	Fr., C. E.	207 Gold, 3219		Maxton, N. C.
White, G. L.	Fr., E. E.	210 Wat., 3028		Charlotte, N. C.
White, Jean E. (Miss)	Pratt & W.	601 Hinsdale St.		Raeford, N. C.
White, N. M., Jr.	Jr., Ae. E.	6 Enterprise St.		Raleigh, N. C.
White, R. W.	Fr., Ag. Ed.	226 Bagwell, 3358		St. Simon's Island, Ga.
White, T. F.	Fr., M. E.	305 4th, 3131		Alexander, N. C.
White, W. H., Jr.	Fr., For.	317 Bagwell, 3383		Pleasant Garden, N. C.
White, W. J.	Fr., Arch. E.	303 Bagwell, 3369		Louisburg, N. C.
Whitehead, R. L.	Fr., Ae. E.	213 Bagwell, 3345		Durham, N. C.
Whitehurst, T. B., Jr.	Jr., Ae. E.	311 Bagwell, 3377		Hobgood, N. C.
Wiggs, C. W.	So., E. E.	204 Welch, 3252		Greensboro, N. C.
Wilber, S. C., Jr.	So., Arch. E.	125 Woodburn Rd.		Smithfield, N. C.
Wiley, J. M.	So., Ch. E.	12 Horne St.		Charlotte, N. C.
Willets, A. L.	Fr., E. E.	323 Bagwell, 3389		Winnabow, N. C.
Williams, B. T., Jr.	Jr., Ae. E.	6 Enterprise St.		Stedman, N. C.
Williams, C. F., Jr.	Fr., Ag.	1912 Lewis Circle		Raleigh, N. C.
Williams, H. A., Jr.	So., M. E.	2513 Clark Ave.		Spencer, N. C.
Williams, Jack Edward	Fr., E. E.	307 Gold, 3231		Morganton, N. C.
Williams, John Edgar	Fr., Ch. E.	303 Gold, 3227		Wilmington, N. C.
Williams, T. B.	Fr., Tex.	209 Welch, 3257		Asheboro, N. C.
Williard, C. H., Jr.	So., Ag.	Withdrew		High Point, N. C.
Willis, C. Z.	So., Ag. Ec.	Y-4 Country Club Homes		Raleigh, N. C.
Wilson, A. W.	Fr., Ag. Ed.	2609 Clark Ave.		Hillsboro, N. C.
Wilson, D. S., Jr.	Fr., C. E.	203 N. Blount St.		Raleigh, N. C.
Wilson, F. Veronica (Miss)	Fr., Cer. E.	2220 Hillsboro St.		Lakewood, N. J.
Wilson, J. A.	So., Ag. Ed.	106 Berry, 4306		Scotland Neck, N. C.
Wilson, J. D.	Fr., Ag. Ed.	208 Bagwell, 3340		Littleton, N. C.
Wilson, T. E.	Fr., Ag.	329 Bagwell, 3359		Louisburg, N. C.
Winecoff, C. R.	Fr., E. E.	232 Bagwell, 3364		Albemarle, N. C.
Winslow, H. B.	Fr., Ag.	108 4th, 3118		Robersonville, N. C.
Witty, R. L., Jr.	Fr., Ag.	309 Welch, 3269		Summerfield, N. C.
Wood, C. C.	Fr., E. E.	612 Graham St.		Raleigh, N. C.
Wood, J. L.	Fr., Ch. E.	303 Wat., 3039		Fayetteville, N. C.
Wood, R. N.	Sr., An. Prod.	103 Chamberlain St.		Graham, N. C.
Wood, W. H.	Fr., Tex.	102 Bagwell, 3302		Washington, N. C.
Wood, W. S.	So., Ch. E.	303 Wat., 3039		Fayetteville, N. C.
Woodard, D. P., Jr.	Fr., E. E.	115 Wat., 3015		Laurel Hill, N. C.
Woodley, W. L., Jr.	Fr., C. E.	315 Wat., 3051		Rocky Mount, N. C.
Wooten, D. M.	Fr., C. E.	302 Welch, 3262		Fountain, N. C.
Wooten, R. E.	Jr., M. E.	311 West Park Dr.		Raleigh, N. C.

## NORTH CAROLINA STATE COLLEGE

<i>Name</i>	<i>Classification</i>	<i>Dorm. Box No. or St. No.</i>	<i>School Address</i>	<i>Home Address</i>
Wooten, W. A.	Fr., Ae. E.	301 Wat., 3037		Princeton, N. C.
Workman, J. F.	Fr., Ch. E.	228 Bagwell, 3360		Thomasville, N. C.
Worsley, R. K.	Fr., Ind. E.	316 Wat., 3052		Greenville, N. C.
Worst, R. F.	Fr., I. Arts Ed.	Fieldhouse		Brooklyn, N. Y.
Wrenn, Emma L. (Miss)	Fr., Tex.	2012 McCarthy St.		Portsmouth, Va.
Wright, E. E.	Sr., An. Prod.	306 4th, Box 5565		Tabor City, N. C.
Wroten, H. C.	Jr., Ae. E.	Carroll House (Infirmary)		Norfolk, Va.
Wyckoff, R. A., Jr.	Fr., Tex.	106 Bagwell, 3306		Stanley, N. C.
Yachan, E. D.	Fr., Tex.	106 4th, 3116		Santiago, Chile
Yates, E. C., Jr.	Fr., Ae. E.	307 Calvin Rd.		Raleigh, N. C.
Yates, R. G.	Fr., Arch. E.	324 Bagwell, 3390		Chadbourne, N. C.
Yelverton, R. L., Jr.	So., M. E.	118 Hillcrest Rd.		Raleigh, N. C.
Young, J. W.	Fr., E. E.	115 Wat., 3015		Princeton, N. C.
Youngblood, J. C.	So., C. E.	Withdrew		Fletcher, N. C.
Younts, B. R.	So., Ag. Ed.	2305 Clark Ave.		Lexington, N. C.
Zachary, S. J.	Fr., E. E.	101 4th, 3111		Taylorsville, N. C.
Zickefoose, M. S.	Fr., Occ. I. & G.	Fieldhouse		Buckhannon, W. Va.







